AN INDUSTRIAL PUBLISHING CORPORATION MAGAZINE

JANUARY, 1958

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Precision Metal Molding

PMM

INCLUDING DIE CASTINGS MAGAZINE

DIE CASTINGS

INVESTMENT CASTINGS

PERMANENT MOLD CASTINGS

PLASTER MOLD CASTINGS

POWDER METALLURGY

SHELL MOLD CASTINGS

2nd Annual

Die Casting Directory

see page 3

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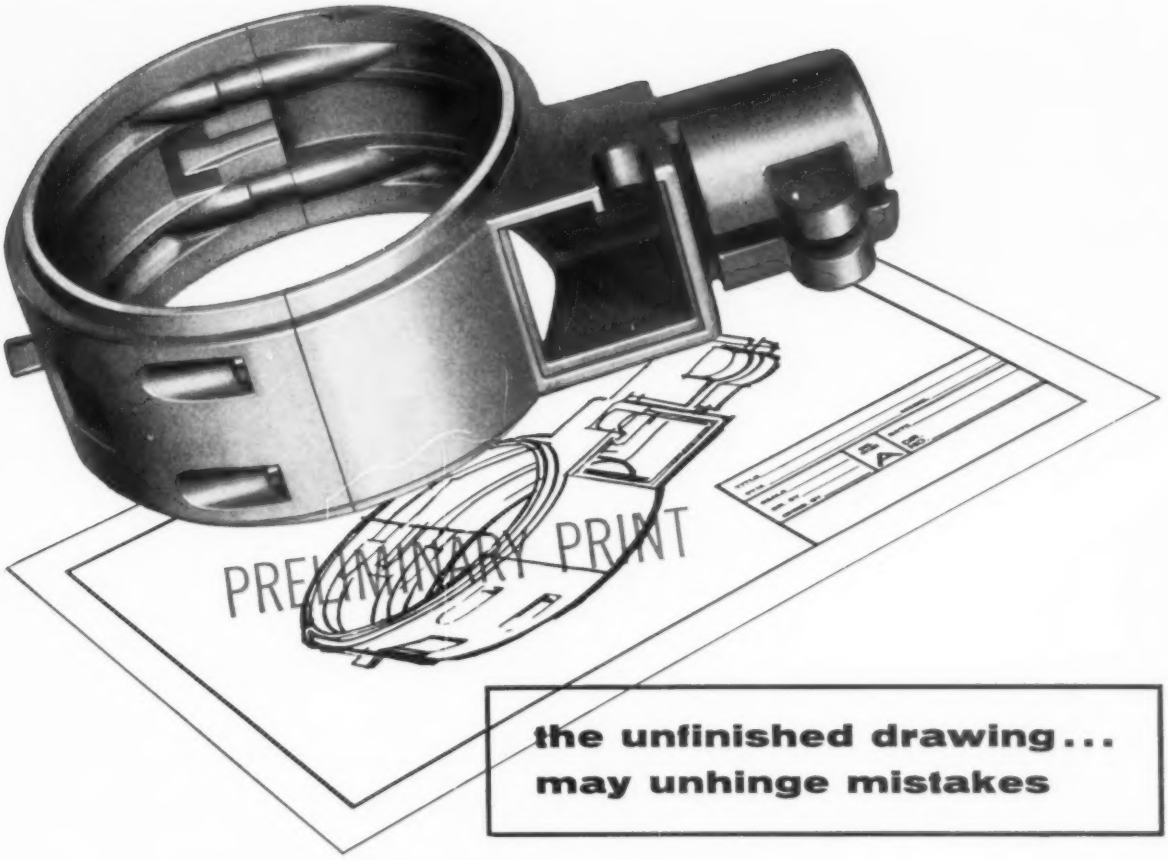

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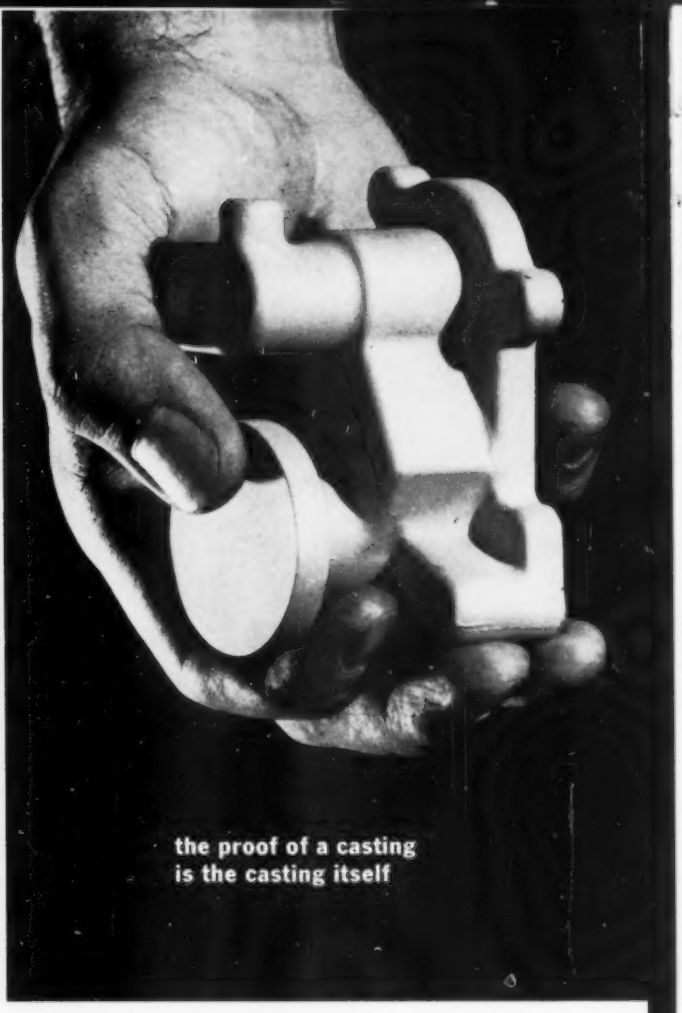

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And here is a practical consideration: If you are now using 356-T6 alloy castings, you can switch over to castings made by Arwood's new "Suparcast" process *without the need to change specifications.*

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IN THIS ISSUE

January 1958: Volume 16 Number 1

COVER STORY

THE SECOND ANNUAL directory of jobbing die casters is presented in this issue. When this directory first appeared in January 1957 the acceptance by the purchasing public was so overwhelming that an annual directory was clearly indicated. This year's directory follows the style set in 1957, but is larger by the inclusion of many companies not listed before. The directory starts on page 89.

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43 **USING SINTERINGS RAISED PART LIFE 400%**
By combining materials that are non-compatible by ordinary metallurgical methods, long-life sinterings have cut maintenance costs.

44 **WHAT WILL BE THE FUTURE OF INVESTMENT CASTINGS IN AIRCRAFT?**
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50 **FOUR GOOD REASONS WHY DIE CASTINGS PAY FOR THEMSELVES**
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53 **DESIGN TIPS**
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56 **PROTOTYPES THAT SHOW CASTING DESIGN FLAWS**
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132 **FIBER METALLURGY — A NEW PROCESS**
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66 **DIE CASTINGS CAN BE COLOR FINISHED WITHOUT MACHINING**
By paying attention to as-cast surfaces, location of parting line and proper ribbing of the castings, a smooth, attractive, enameled finish results.

88. **JET ABRASIVES EVALUATE ORGANIC COATINGS**
A report on a new method for determining the abrasion resistance of organic coatings that was developed by the Bureau of Standards.

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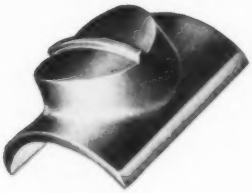
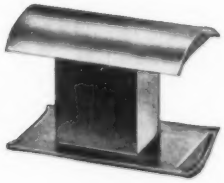
RESISTOX® Metal Powders are more stable, resist oxidation 5 to 10 times longer!





This test proves that the Resistox Process gives Glidden Metal Powders more stability through greater resistance to oxidation. You can store Glidden Resistox Metal Powders over long periods of time without fear of oxidation. And you can speed up production of metal parts, with less material-waste and die-wear, greatly improved finish, appearance, and performance characteristics.

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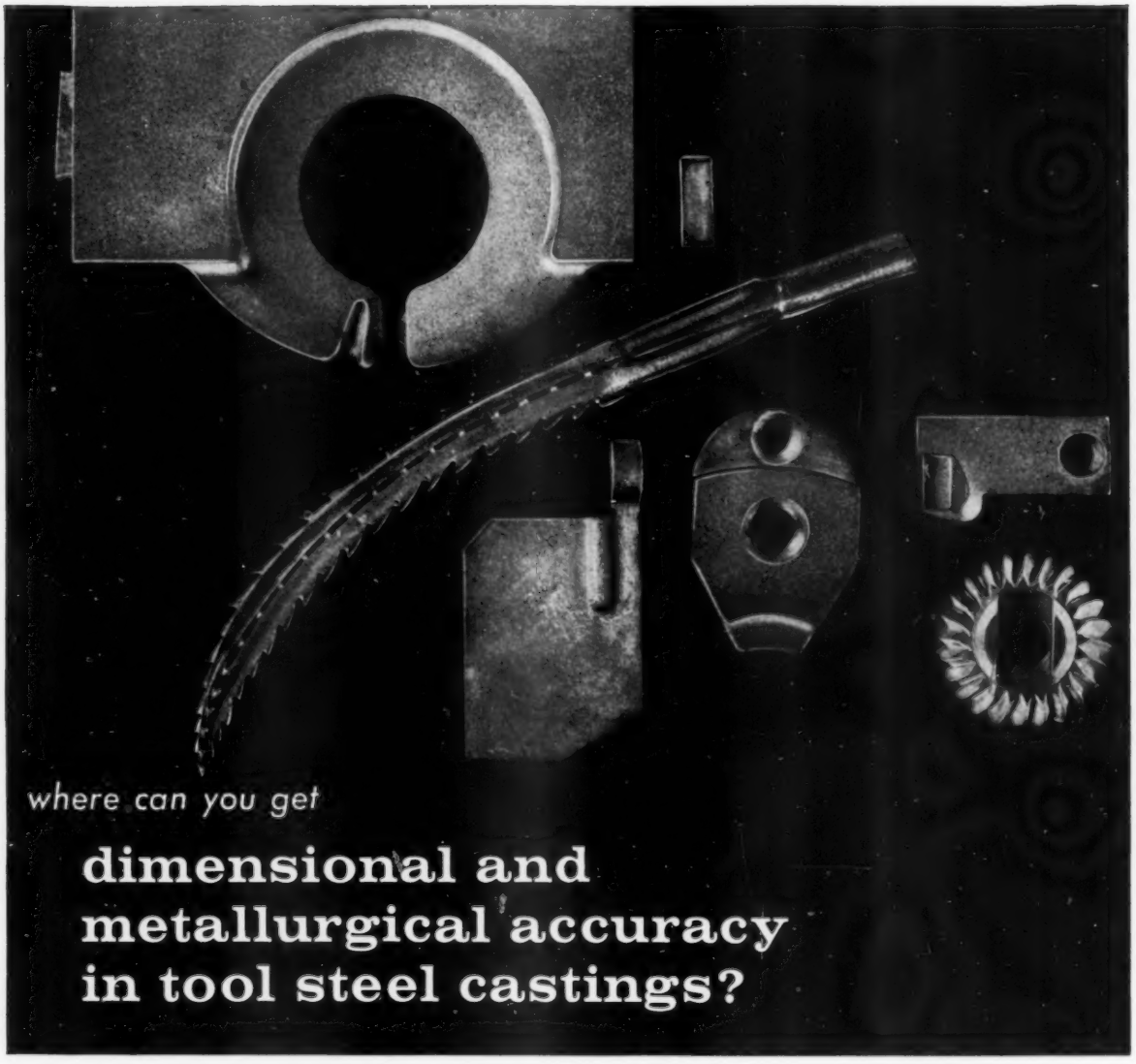

where can you get

dimensional and metallurgical accuracy in tool steel castings?

The quality of tool steel castings depends heavily on metallurgical control and foundry techniques which can be acquired only through long experience in handling tool steels. That's why it will pay you to get your castings directly from Crucible, largest and leading producer of tool steels.

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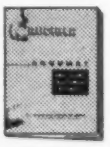
Crucible Accumet Tool Steel Castings can help you reduce costs and improve product performance. Consider Crucible's extensive facilities and experience when you need either investment or sand castings. Write for free booklet to: *Crucible Steel Company of America, The Oliver Building, Mellon Square, Pittsburgh 22, Pennsylvania.*



CRUCIBLE first name in special purpose steels

Crucible Steel Company of America

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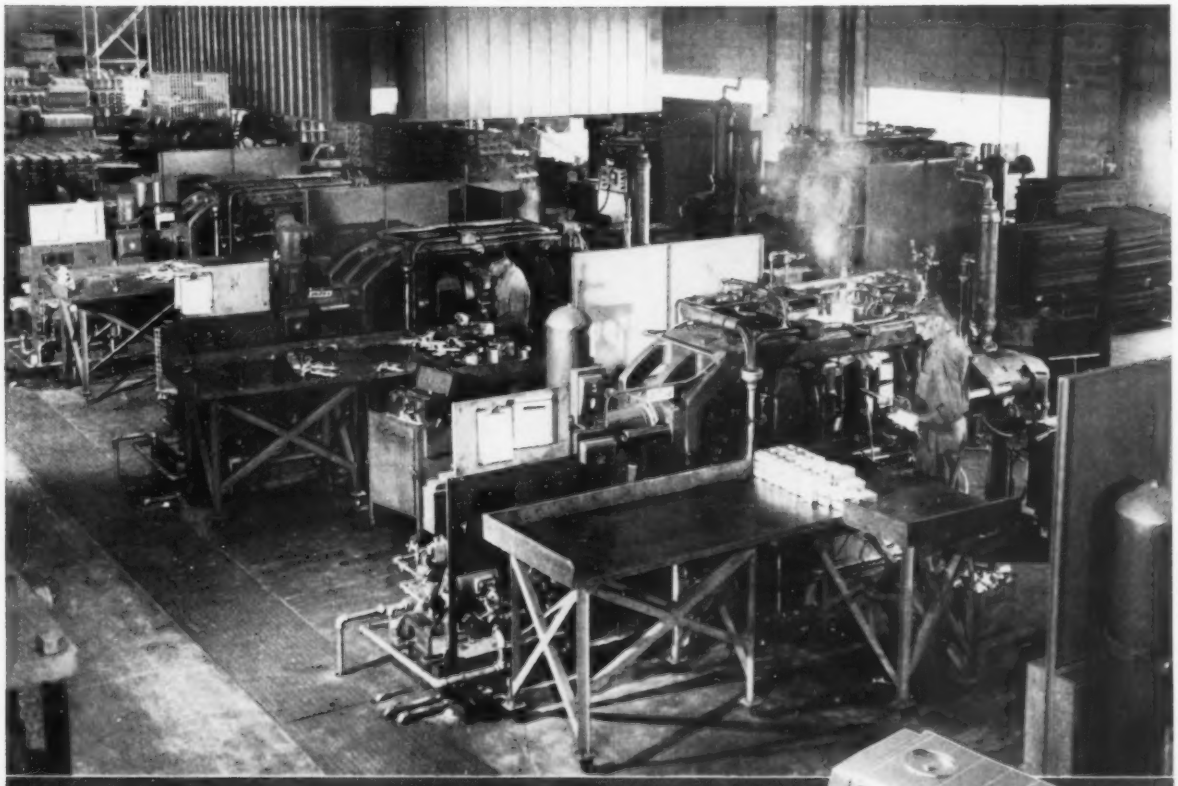
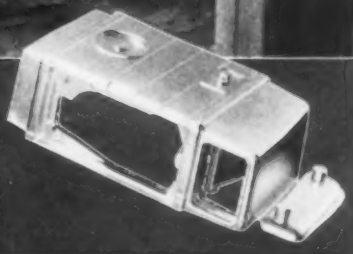


Now Bell and Howell... die casting on LESTERS...saves over 25% on this typical casting!



Bell and Howell Company, the only major photographic equipment manufacturer doing a major part of their own die casting, tell a story that is classic as a testimonial to the wisdom of installing Lester machines.

Mr. W. D. Johnson, Die Casting Manager of the company, has been working on the project since its inception, and was there when the first machines were installed—well over two years ago.

Speaking from this vantage point about the housing for their Monterey 8mm movie camera shown here, he says, "We had never done any die casting previous to our set-up of these machines a little over two years ago, and began production on this rather difficult casting on a high monthly requirement...This production schedule has continued since that time. *The savings to Bell and Howell on this particular casting have been well above the average savings of approximately 25% for the entire die casting operation.*"

●

Complete details on the full line of Lester Die Casting Machines are available in Bulletin 101. *Write for your copy TODAY.*

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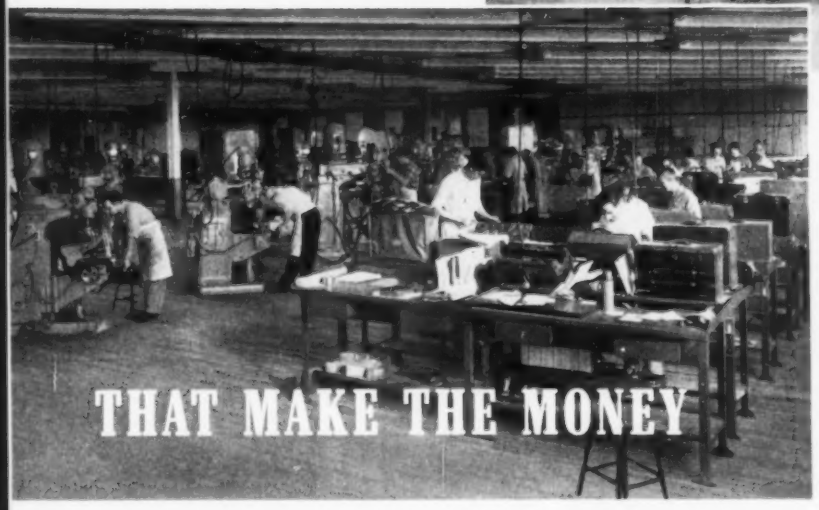

HERE

are some looks at Midland's increased facilities for tooling large or small capacity molds for precision-minded molders.

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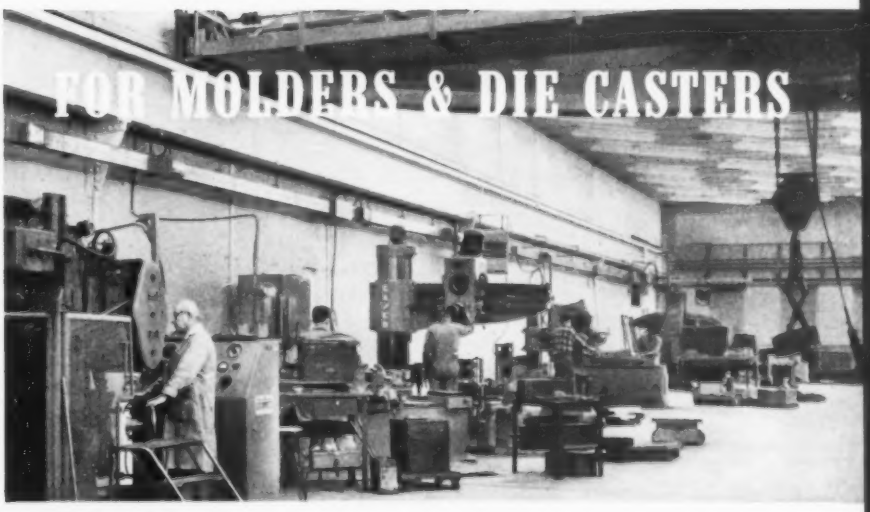
molds & dies are made by men who have made the business a career.

HERE

is the industry's source for intricate and precise molds for producing intricate and precise units. Midland as always is ready to quote or discuss your mold or die problems.



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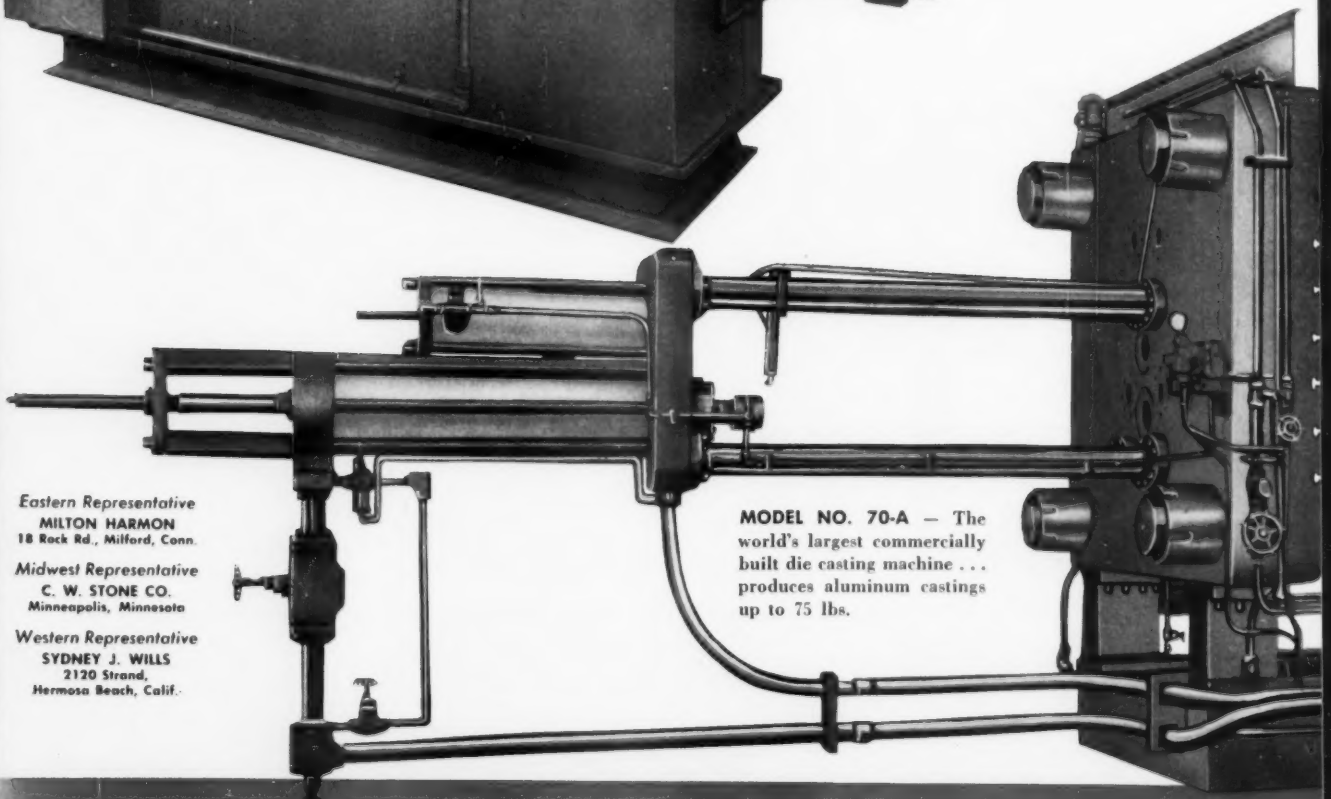

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Cast-Master's new expanded operation now offers a complete package . . . jigs, fixtures, dies . . . designed and developed to meet every requirement. Whatever your problem our engineering department is equipped to tackle it. Phone, write or wire, without obligation.

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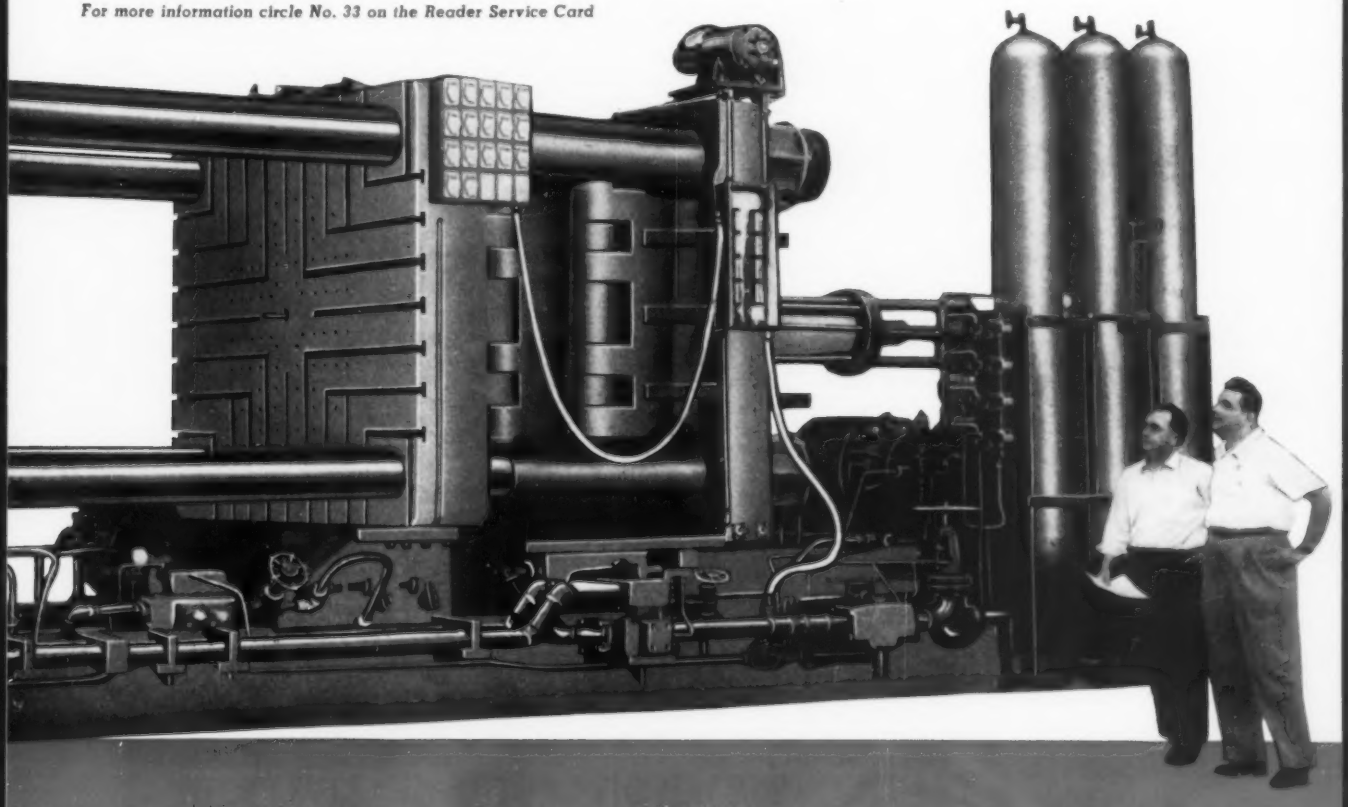
- *Loads Laminations*
- *Die Casts*
- *Trims*
- *Unloads 4 Rotors Automatically*

A major motor manufacturer gave Cast-Master the job of stepping up production and reducing labor on die-casting laminated rotors. Cast-Master solved the problem with a new automatic loader-unloader.

NEW DETAILED BROCHURE AVAILABLE



23901 Aurora Rd. • Bedford, Ohio

HIGH STRENGTH STEEL CASTINGS will be the objective of a new $1,093,854 Air Force contract awarded to Chance Vought Aircraft. Contract calls for the company to work with three foundries over a two-year period. Primary purpose is to up-grade steel castings from the 275° F service range at which they now function, to 1000° F in tomorrow's higher speed aircraft. John Dietz, Vought structures materials engineer, will be project engineer. Data obtained will be available to all foundries making military aircraft castings.

The contract covers five phases: 1) to select three foundries to do development work on actual aircraft parts designed by Vought; 2) select steels capable of being stressed to 180,000-220,000 psi and work out ways to make them castable; 3) design parts to be cast; 4) make trial production of contoured parts in larger lots; 5) make pilot production of selected castings in quantities large enough to prove consistent results.

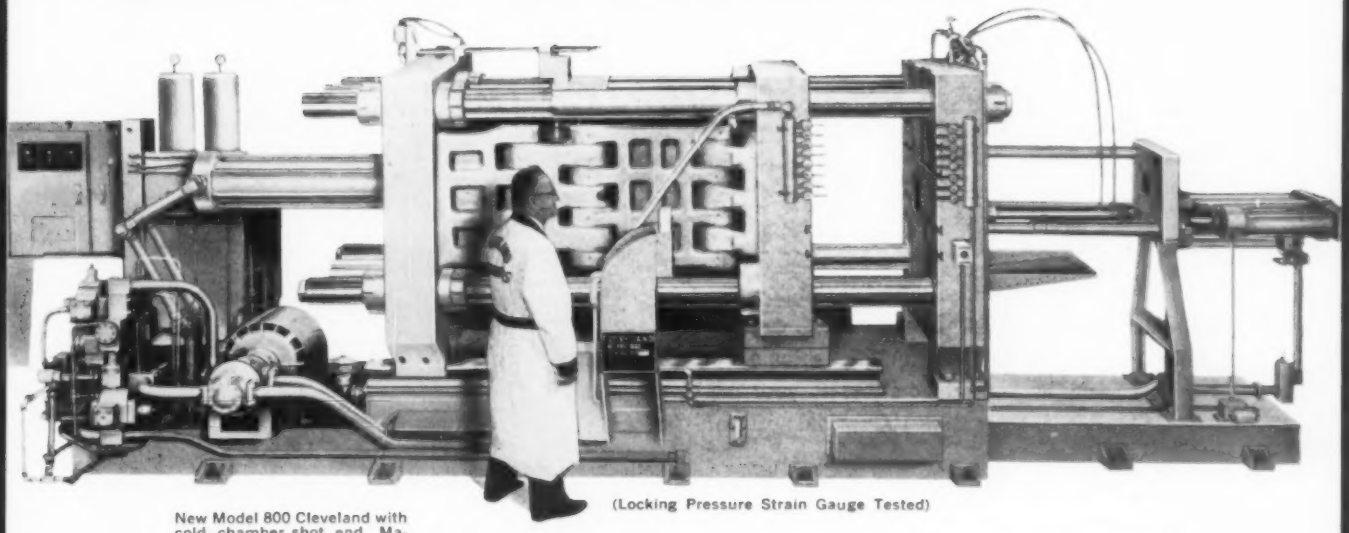
RESEARCH IN THE DIE CASTING PROCESS will be undertaken by a new lab set up in the Aluminum Company of America's Chicago Works. A full-scale pilot plant will permit studies to be made under production conditions. John Moorman, Chief metallurgist for Alcoa's Garwood (N.J.) works, has been named head of the new facility and assistant chief of the Cleveland Research Division under which the lab will function. According to W. R. Butler, Alcoa's manager of die casting sales, "Alcoa's new research effort should result in expanded use of die castings in such fields as decorative trim and functional automotive applications, electronic and business machines, appliances, portable tools and internal combustion engines." Projects will be aimed at lower cost production methods and techniques for manufacturing die castings of superior quality.

SIX OF THE LARGEST PROPELLERS EVER CAST will be made by the Eddystone Div. of Baldwin-Lima-Hamilton Corp. Measuring 24′ in diameter, the propellers will be for tankers being built by Newport News Shipbuilding and Dry Dock Co. Three of the four-bladed wheels weighing 90,000 lbs. in manganese bronze, will be the heaviest ever cast. The other three in Nialite will weigh 75,000 lbs. each. Nialite is a zinc-free, nickel-bearing alloy developed by B-L-H. It is lighter and stronger than manganese bronze and is less subject to erosion, corrosion and cavitation.

CASTING SCRAP LOSSES have been cut from 30% to 40% at the Gaines foundry in Rivera, Cal. A new X-ray department occupying 1,000 square feet in the plant which makes sand, shell and permanent mold castings, is responsible for the savings. Sample castings are taken from the production line every two hours. Within 15 minutes, the line foreman has the results. Ten percent of all castings poured get the X-ray check. If defective castings are found, the line is shut down and two hours of production may be lost. However, the two-hour frequency for X-ray check-up has been found most practical.

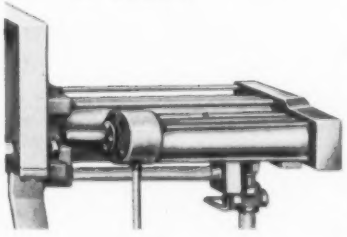
Continued on page 19

NEW 800 TON CLEVELAND Hydraulic Die Casting Machine



(Locking Pressure Strain Gauge Tested)

New Model 800 Cleveland with cold chamber shot end. Machine weight is 28¼ tons. Readily converts to hot chamber operation.



Incorporating an intensifier, new Cleveland cold chamber shot end provides high pressures on metal; high plunger speeds (both adjustable).

Now available for producing castings up to 20 lbs. aluminum, 46 lbs. zinc. This *big*, newest Cleveland has 55″ x 54″ die plates; 33″ x 33″ space between tie bars; 38″ max. to 20″ min. die thickness; 15″ to 24″ die opening. Massive toggle system, with 7″ dia. tie bars and cross head guide bars, 9½″ thick platens, insures extreme rigidity and positive die alignment . . . with *guaranteed* 800-ton locking pressure!

A highly advanced design of cold chamber shot end, incorporating an *intensifier*, assures top-quality, dense castings. Shot plunger speed, after its initial slow, forward movement, can be adjusted to attain any speed up to 500 f.p.m. At any predetermined plunger position, the shot intensifier can be activated to generate plunger pressures up to 20,000 p.s.i. Intensifier pressure is also adjustable. Throughout, the new Model 800 is *Cleveland-engineered* to give you highest casting quality with utmost reliability of machine performance. Call in a Cleveland sales engineer, or write direct, for machine specifications.

Remember, Clevelands Cut Costs!

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303	414	5334	5378	5640	30303	51446
304	416	5350	5380	5643	30303F	60303A
308	420	5351	5382	5645	30304	60304
309	430	5352	5385	5665	30310	60310
309+W	430F	5354	5386	5700	30316	60316
310	431	5355	5388	5710	30321	60347
316	431A	5358	5389	5735	30347	60410
321	436	5360	5392	5765	51410	60420
327	440A	5361	5393	6270F	51414	60442
329	440B	5362	5394	6274F	51416F	60446
330	440C	5363	5526	6280C	51420	70310
331	440F	5366	5537	6350	51430	70310A
347	442	5369	5610E	6382	51431	70327
403	446	5370	5616	6428	51440A	70330
406		5372	5621	7834	51440B	70331
		5373	5628		51440C	70446
		5375	5630		51440F	

MISCELLANEOUS

Armco 17-4PH • GMR 235 • Inconel® • Invar • Monel® • NiResist® IA • NiResist® IIA • NiResist® III • Waspalloy

®International Nickel Co.

You name the alloy... we'll produce to your specs. —in record time!

THE watchword of CANNON-MUSKEGON is "CONTROL." Careful selection of the finest raw materials . . . rigid melting procedures . . . complete chemical and physical testing facilities, plus closely supervised handling — produce alloys to your most exacting standards. More than 100 special and standard alloy analyses are produced each year.

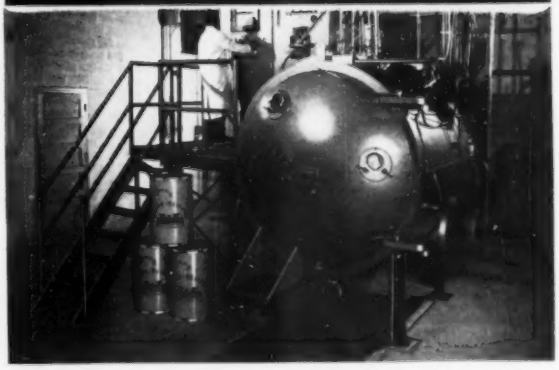
The alloy list above is typical of production "regulars" for scores of users in all industrial fields. If you don't see what you need — remember, our facilities are open to "tailor" alloys to your specific needs. We'll also recommend proper in-plant handling and heat treating procedures to assure the desired physical and chemical properties in your final product.

FOR IMMEDIATE REFERENCE — write for your personal copy of Cannon-Muskegon's 6-page handbook for metallurgists, giving you data on both UltraMet and MasterMet alloy service.

ULTRAMET VACUUM-MELTED ALLOYS FOR INDUSTRY

MASTERMET CERTIFIED ALLOYS FOR INDUSTRY

and CANNON-MUSKEGON offers you both vacuum and air-melting facilities for cobalt-, ferrous- and nickel-base alloys in a wide variety of cast forms.



UltraMet alloys are produced in this latest design vacuum melting furnace — production center for a virtually unlimited variety of high temperature, corrosion resistant alloys for severe-stress applications.

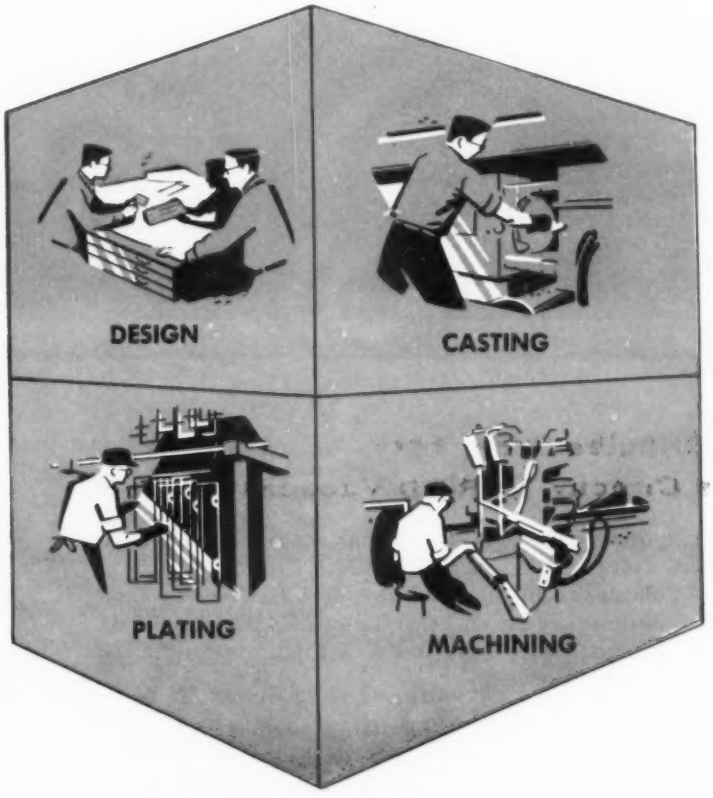
CANNON-MUSKEGON CORPORATION

2871 Lincoln Ave. • Muskegon, Michigan, U.S.A.

METALLURGICAL SPECIALISTS

For more information circle No. 31 on the Reader Service Card

East or Midwest, AINSWORTH-PRECISION helps you cut costs with "ONE PACKAGE" DIE CASTING SERVICE



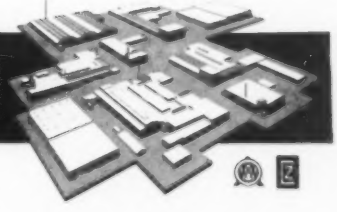
"Packaged Buying" of aluminum, zinc and magnesium die castings is a short-cut to reduced time and labor costs. You need only one supplier with fully integrated facilities in the East and Midwest to supply you with everything —die design, casting, machining, plating and finishing.

Among custom die casters, only Ainsworth-Precision offers you the finest, modern automated plating and painting facilities. From design through packaging, Ainsworth-Precision means "one-stop" economical die casting services.

Now, you can more accurately gauge your own manufacturing schedules by receiving completely finished parts from one source. Choosing Ainsworth-Precision instead of several who are widely scattered is common-sense thinking. On that next job, call our nearest plant or sales office.

AINSWORTH-PRECISION CASTINGS CO.

DIVISION OF HARSCO CORPORATION



FAYETTEVILLE, N. Y. – SYRACUSE, N. Y. – CORTLAND, N. Y. – CHICAGO, ILL.
CLEVELAND, OHIO – KALAMAZOO, MICH. – DETROIT, MICH. – ROCKFORD, ILL.

For more information circle No. 5 on the Reader Service Card

REED VACUCAST gives Cleveland Hardware DENSER

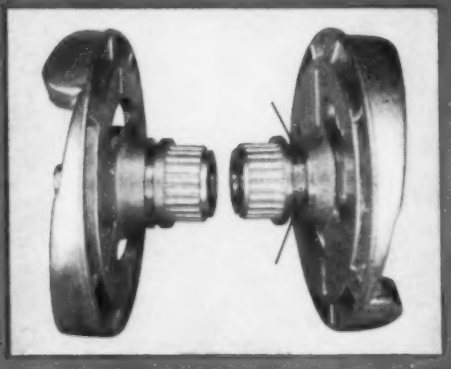
Cleveland Hardware Attributes Order For Portable TV Set Masks Directly To REED Vacucast System

"As a result of being able to reduce wall thickness to .050 of an inch in the zinc casting for a portable TV set mask, we have received a large order," says H. E. White, President of Cleveland Hardware & Forging Company. "This mask could not have been done on a conventional die caster, but with our REED Vacucast machine, we can cast this thin-walled part despite its large area." Cleveland Hardware has also found faster cycles and a vast improvement in the quality of all castings produced on their REED Vacucast.

The REED Vacucast, a vacuum die casting system offered exclusively by Reed-Prentice as original equipment on standard machines, has proven itself in a number of standard production shops. Cleveland Hardware & Forging Company is the latest to find these many advantages in the REED Vacucast:

- Cycling time is 25% faster on some jobs.
- Reject rates have been cut by more than 50% —in some instances 90%.

CASTINGS, IMPROVED FINISH



The photos above show the strength which the REED Vacucast gives to even the thinnest wall castings—flexible enough to bend, yet strong enough to withstand breaking.

◀ Porosity was a problem (right) for Cleveland Hardware in die casting this zinc cam. Now, their REED Vacucast gives them dense castings, cuts reject rates (left).

- Surface finish has been improved, greatly reducing polishing and buffing.
- Less pressure is needed. Many find that a 400-ton machine can replace a conventional 600-ton machine.
- Permissible reduction in wall thickness has meant great savings in metal. Now competes favorably with metal stamping.
- Porosity has been virtually eliminated.
- Improved casting skin and higher density permits higher temperatures for better paint-to-part bond.
- As much as .02″ greater skin thickness in thin castings is common.

These are just a few of the many advantages found in the REED Vacucast. To find out how a REED Vacucast can help solve many of the problems you now have in die casting with conventional equipment, mail the coupon here today to Reed-Prentice Corporation, 677 Cambridge Street, Worcester 4, Mass., or contact our nearest sales office.

REED-PRENTICE

Affiliate of PACKAGE MACHINERY COMPANY

677 CAMBRIDGE STREET, WORCESTER 4, MASS.

BRANCH OFFICES: NEW YORK • CLEVELAND • CHICAGO • BUFFALO • DAYTON • DEARBORN • KANSAS CITY • LOS ANGELES

REED-PRENTICE CORP.
677 Cambridge Street
Worcester 4, Mass.

Please send me more information on REED Vacucast System as ☐ original equipment ☐ conversion units.

Name_____
Title_____
Company_____
Street_____
City_____ State_____

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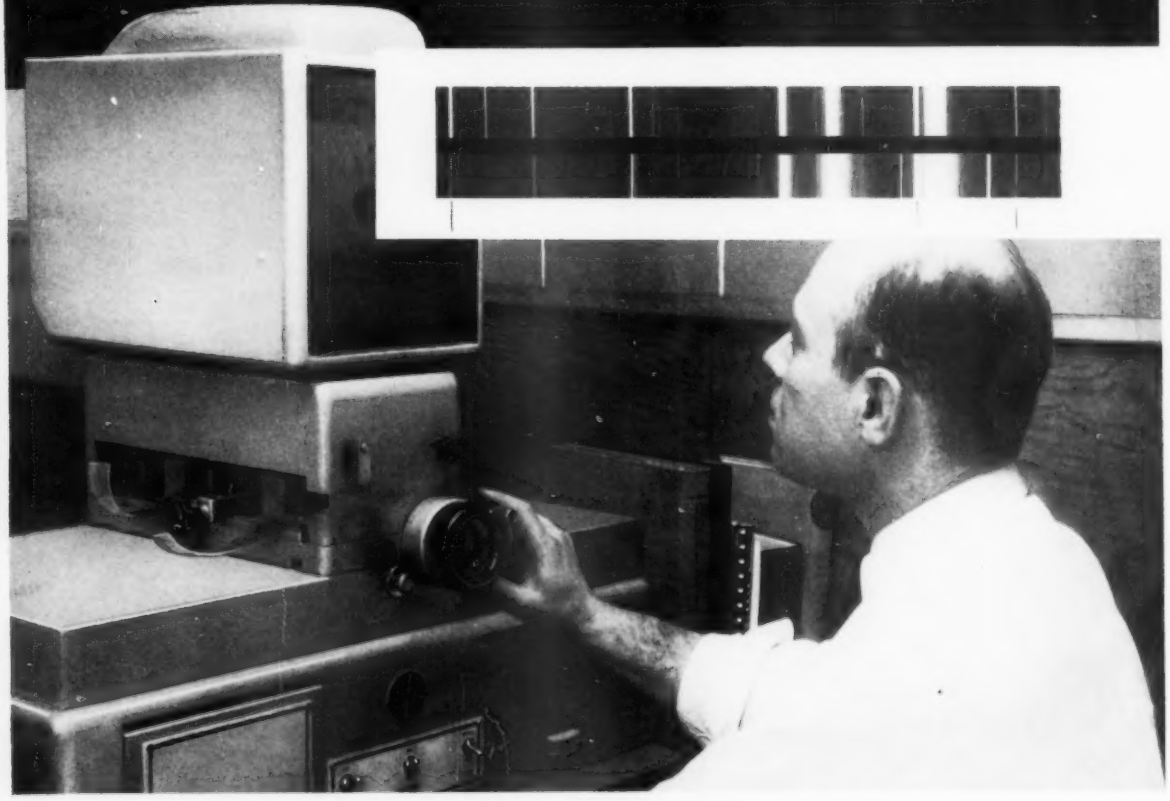
an important step in Henning's start-to-finish control



HB&S "CAMERA" STOPS METAL IMPURITIES YOU CAST!

The two strips above are the spectrograms used in checking the composition of one heat of HB&S Zamak-5.

The top ARC spectrum shows the Impurities — Lead, Tin, and Cadmium — to be present as minute traces.

The bottom SPARK spectrum shows the Principal Alloying Elements — Copper, Aluminum, and Magnesium — to be present in proper proportions, proving this sample in spec.

Specifically engineered and quality controlled to meet your exact casting needs, HB&S Zamak alloys are sampled while still in the molten state, spectrographically analyzed to assure the purity and uniformity of the metal. Each element in the alloy, in each heat, is fingerprinted and recorded. As the molten metal is poured into bars the alloy number is stamped on each bar . . . the heat number is marked on every pallet, you know exactly what you're getting . . . are assured of uniformity. All important steps in Henning's start-to-finish control which guarantees ingots ordered will be 100% on spec.

Still another Henning service . . . alloy bars are shipped on consumable skids.

Write for these authoritative booklets: "DIE-CASTING WITH ZINC ALLOYS" explains the factors influencing the production of sound castings, a technical guide for plant managers and die casting machine operators, available in quantities. "REFERENCE BOOK AND GUIDE ON ZAMAK (ZINC BASE) ALLOYS" gives valuable production and design data for die casters and engineers covering composition, mechanical and physical properties, dimensional stability, use in different types of castings.

HENNING BROS. & SMITH, INC.

91-117 Scott Ave., at Randolph St., Brooklyn, N.Y.

Smelters and refiners of aluminum, bronze, brass, zinc, lead

Dependable service since 1922

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CASTING ABOUT

continued from page 12

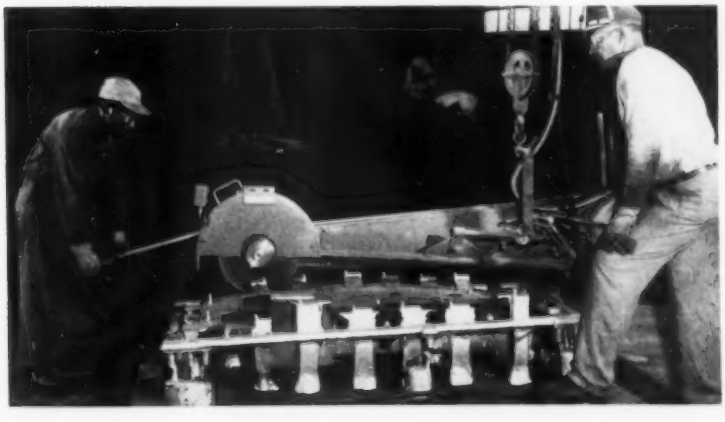
METALS USED IN MISSILES can be protected to meet temperatures above 2500 F by applying new ceramic coatings. The Bettinger Corp., which has just completed a 10-year research program to develop these coatings, says these are the highest operating ranges ever achieved with fired ceramic coatings. For five years, the company has been active in coating "hot parts" of jet engines. Now, the new coatings will be effective on missile power plants and skins.

LARGE POWDERED METAL PARTS will be made on a new 400-ton hydraulic press installed this month by International Powder Metallurgy Company in Ridgway, Pa. Only three other companies are reported to have powdered metal presses of this size. Jobs to be produced on it include transmission gears for washing machines and automobiles motor frames and stators and other large structural parts. The press was designed and constructed under the direction of IPM's chief engineer, G. J. Hoehn. Maximum size of parts now possible: 8" in diameter x 4" long.

HOME APPLIANCES IN THE NEXT 10 YEARS will bring in sales dollars totaling $85 billions, according to figures released by Hotpoint Company. Their 10-year forecast just issued says that about 286,000,000 major appliances will be sold in the coming decade. This includes: 9,200,000 electric ranges, 10,700,000 built-in appliances, 43,700,000 refrigerators, 10,500,000 food freezers, 27,700,000 air conditioners, 7,900,000 electric water heaters, 7,400,000 dish washers, 8,500,000 food waste disposers, 38,000,000 clothes washers, 16,000,000 electric clothes dryers, 10,300,000 washer-dryer combinations, 53,200,000 black and white TV sets, and 43,100,000 color TV sets.

MORE RESEARCH WAS DONE by Armour Research Foundation of Illinois Institute of Technology this year than ever before. A record 734 research projects included 404 for industry and 330 for government. Gross volume for this work rose to $14,067,534 . . . $2 million or 18% ahead of 1956.

BUYERS WHO HAVE BEEN WONDERING when production quantities of North American Aviation's high strength "42B" casting alloy might become readily available now can be told . . . Never, as 42B! Navan Products, Inc., Santa Monica, Cal., North American commercial marketing subsidiary, has announced that the alloy now is in quantity production as "Tens-50", a name derived from the alloy's tensile strength range to 50,000 psi. The alloy was first reported in PMM in March 1957, with complete tabulation of properties. One West Coast firm, Rayson Casting & Mfg. Co., Gardena, Cal., is casting pylons, below, for North American's F-100 Super Sabre in the alloy. Another F-100 part which formerly cost $350 to mill from bar stock is being cast for approximately $15 and has the same strength-to-weight ratio.



NEW DESIGN OPPORTUNITY

With Monarch Aluminum Permanent Mold Castings

Modern methods in mold designing—metallurgy—and mass production operations make Monarch Permanent Mold Castings more versatile to fully meet today's end-product requirements competitively.

From complicated industrial castings to finished consumer product castings, ready for assembly, Monarch's wide range of services offer "More Casting Value per Dollar".

This new approach to casting evaluation and "One Source" production in permanent mold—Aluminum Die Casting and Zinc Die Castings is presented in a new brochure, "Manufacturing Achievements in Molten Aluminum". Write for Your Copy Today.

MANUFACTURING in MOLTEN ALUMINUM ACHIEVEMENTS

MONARCH ALUMINUM MFG. COMPANY

9205 Detroit Avenue Cleveland 2, Ohio

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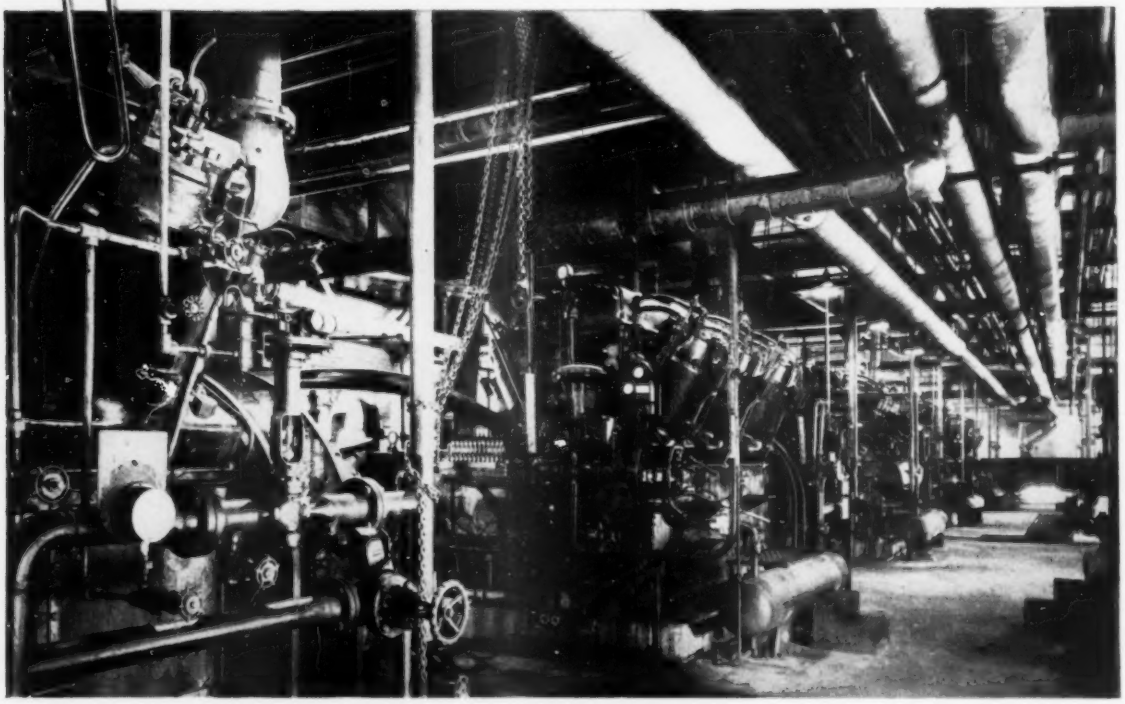
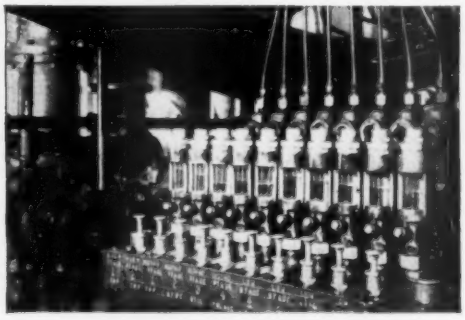
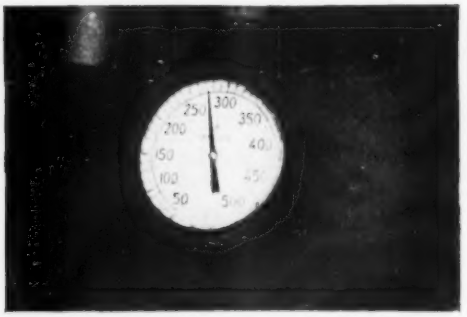


"... Cellulubes were tested for two years in four Cooper Bessemer Air Compressors. Cylinder wear was negligible. Deposits normally found in compressor auxiliaries and valves were reduced or eliminated."



"... A conventional lubricator will pump Cellulubes satisfactorily. No obnoxious vapors—does not present a personnel problem in terms of handling a toxic material."



"... No pressure surges nor evidence of fire in the air accumulator when Cellulubes are used. They are excellent lubricants, and also are effective as detergents."

CELANESE CORPORATION OF AMERICA, CHEMICAL DIVISION
DEPT. 589-A, 180 MADISON AVENUE, NEW YORK 16, N. Y.

Please send me:

☐ Technical bulletin ☐ Sample of_____viscosity.

Name_____ Title_____

Company_____

Address_____

City_____ Zone_____ State_____

Application I have in mind_____

For more information circle No. 34 on the Reader Service Card

From a trial file covering two years testing in Cooper Bessemer 3-stage air compressors

"NO PRESSURE SURGES...NO EVIDENCE OF FIRE... EXCELLENT LUBRICATION...WHEN FIRE-RESISTANT CELANESE CELLULUBES ARE USED!"

"Cellulube has now been in four of our Cooper Bessemer air compressors for approximately two years. The compressors were inspected during a recent Catalytic Reformer General Inspection. Cylinder liner wear was negligible, particularly when compared to the amount of wear we had experienced when previously using a synthetic lubricant. Cellulube, in addition to acting as a lubricant, is also effective as a detergent. Compressor cylinder air passages which had been heavily coated with carbonaceous materials and deposits laid down by the previous synthetic lubricant, are gradually being removed and the compressors again show the original factory finish. Deposits on valve cages and plates have been reduced and are no longer a problem.

"Cellulube does not present a personnel problem in terms of handling a toxic material. There are no obnoxious vapors from Cellulube. A conventional lubricator will pump Cellulube satisfactorily.

"There have been no pressure surges nor evidence of fire in the air accumulator.

"We believe this material is an excellent lubricant plus the fact that acting as a detergent the deposits normally found in compressor auxiliaries and valves have been reduced or eliminated."

These results are typical of what you can expect from Celanese Cellulubes. They have been developed to meet the pressing need for fire-resistant lubricants which virtually eliminate the problem of carbon deposits.

Celanese Cellulubes are available in 6 controlled viscosities: 90, 150, 220, 300, 550, 1000, S.U.S. @ 100° F. These straight phosphate esters provide excellent lubricity, are non-corrosive and non-reactive.

Celanese Cellulubes open new areas for in-plant protection against fire and explosion. Evaluate them in your own operation. Use coupon to request samples and technical data.

Celanese®
Cellulube®

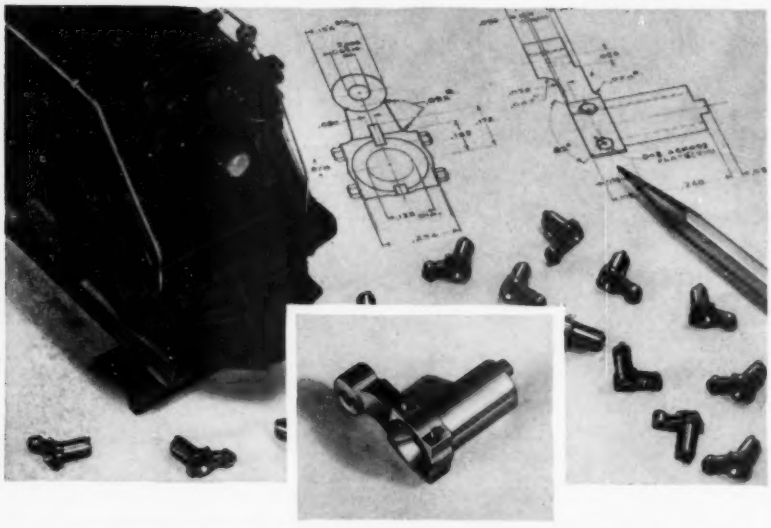
Celanese
CHEMICALS

Celanese Corporation of America, Chemical Division, 180 Madison Avenue, New York 16, N.Y.
In Canada: Canadian Chemical Co., Limited, 2035 Guy Street, Montreal, P. Q., Canada.
Export Sales: Amcel Co., Inc., and Pan Amcel Co., Inc., 180 Madison Avenue, New York 16, N. Y.

CELANESE CELLULUBES

GRC DIE CASTING HELPS LIONEL ACHIEVE TINY PART AUTHENTICITY

Tiny, intricate, too costly to make in their own plant, GRC's specialized techniques made this toy crank economically possible



While it would seem more advantageous for manufacturers to make all parts in their own plants, some have found that a specialist can do it cheaper, faster, and some times even better. This Lionel toy crank is an example. GRC specialized techniques made it possible for them to produce this tiny authentic part more quickly and more economically than Lionel could themselves. Die cast in zinc alloy in a single automatic operation, the cost of the GRC crank was little more than $5.00 per thousand in lots of 500,000.

Miniature in size, intricate in shape, the crank has, for example, four subminiature hex nuts measuring 0.45" across the flats. It is typical of the many small parts problems solved by GRC, who specializes in parts "no bigger than your thumbnail". It is typical too of the close tolerances, clean edges and great accuracy achieved by Gries' methods. Whether simple or complex, quality is uniform—no secondary operations, no scrap loss. GRC delivered parts are ready for immediate use.

The world's foremost producer of small die castings, Gries' exclusive patented methods have resulted in many production economies and give broad flexibility in design. If you have a small parts problem, write for Gries' informative die casting bulletin or send prints for quotations. There is no minimum size; maximum, 1¾" long, ½ oz.

New Gries Bulletin Explains How Movable Multiple Part Units are Cast-Assembled by INTERCAST Method

The unique "intercast" method developed by Gries Reproducer Corporation for cast-assembling in one operation movable multiple part units, as well as continuously interlocked assemblies (such as chains), is explained in a new bulletin. Maximum size for "intercast" parts is 1½" long.

This patented automatic, time-saving, money-saving method is an ingenious refinement of Gries' exclusive method of small parts die casting. Gries' technique of both zinc alloy die casting and plastic molding of tiny parts is well known and has proved of inestimable value in overcoming design limitations and lowering costs. Automatic production assures precise tolerances and uniform quality.

Copies of the bulletin are available from Gries.

GRC Nylon and Other Plastic Molded Parts Accurate and Uniform

Unique, automatic molding techniques developed by Gries Reproducer Corp. permit mass production of nylon and other thermoplastic parts with exceptional accuracy and uniformity. Molding with single cavity techniques, GRC avoids lack of uniformity in size from cavity to cavity, difficulty in matching (flash and off-set at parting line), difficulty in filling. For the ultimate user it means no parts sorting to detect defectives, no selective assembly to compensate for variations, no cleaning operations.

Specializing in tiny parts (their maximum sizes is 1¼" long, .03 oz. in weight, no minimum), GRC can make quick deliveries on quantities from 50,000 to many millions, and will quote promptly upon receipt of blueprints or specifications. Samples and factual bulletin can be obtained by writing directly to Gries Reproducer Corp. in New Rochelle.

GRC High Series Cap Nuts Now Cataloged In Stock

Never before available to industry as a stock item from any supplier, GRC is now stocking for prompt delivery cap nuts with up to 50% greater thread depth. Immediate shipment can be made on a complete range of hex sizes from 5/16" to ⅝". Die cast in zinc alloy with long, clean thread sections, the overall height of the cap nut is well proportioned between the hexagonal section and the dome of the fastener. Protective, neat and attractive, they are rustproof, corrosion-resistant, nonferrous, without tool marks or cut-off burrs. They have a naturally bright finish and if required any standard finish can be applied. Other GRC stock fasteners include wing nuts and screws, round head thumb nuts and screws, standard cap nuts, rivets and others. Catalog and spec sheets on the new high series cap nuts and other fastenings are available on request.

WORLD'S FOREMOST PRODUCER OF SMALL DIE CASTINGS

GRIES

GRIES REPRODUCER CORP.

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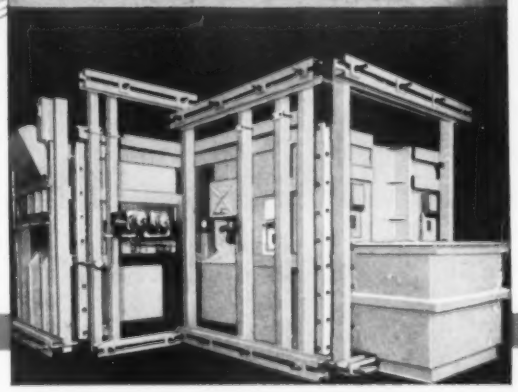
WANT TO MELT A MOUNTAIN OF METAL?

THESE BIG STROMANS WILL DO IT...BUT FAST!

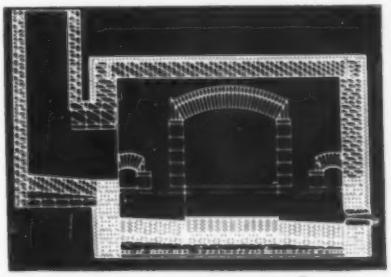


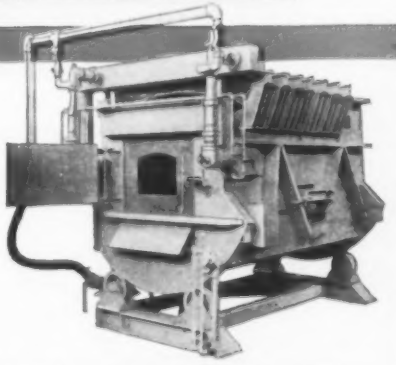
STROMAN LARGE SIZE REVERBERATORY FURNACES

For Melting Unlimited Capacities of Aluminum, Zinc or Brass

These reverbs are built to assure heavy duty production for Smelting, Extrusion work, Die Casting, Permanent Molding and Foundry melting. Now in operation in some of the most prominent plants in the country, they have proved their ability to deliver large tonnages of metal, are easy to work with and around . . . operate most economically and are easy to maintain. Their efficiency and economy will amaze you and convince you of their superiority.

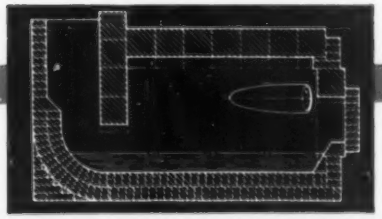
Furnaces of this type are designed to meet customers' individual requirements . . . let our engineers show you how to achieve utmost efficiency and economy in your melting operations.



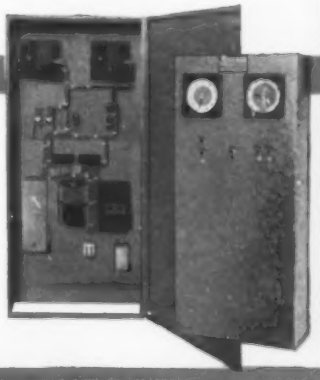


STROMAN TYPE "SW" CRADLE TILTING FURNACE FOR ALUMINUM MELTING SIZES FROM 1,000 TO 3,000 POUNDS

An ideal furnace for breakdown to supply hot metal to holding furnaces for die casting or permanent mold. Also for distribution to the molding floor in sand casting foundries. Tilted by means of an air or hydraulic ram. Furnished complete with gas or oil burners or combination burners, blower to furnish combustion air, and lining made of standard fire brick shapes.



Automatic temperature and safety controls available if desired.



STROMAN CUBICLE TYPE CONTROL PANEL

Stroman design monitor for furnace metal temperature, refractory temperature, high limit blower motor, circuit, electric ignition, and flame safety control, with completely automatic built-in warning system.

Don't forget STROMAN make furnaces for the melting of brass, bronze, aluminum, magnesium, grey iron and all other metals in sizes to meet your needs no matter how large or small.

Write for complete catalogue today!

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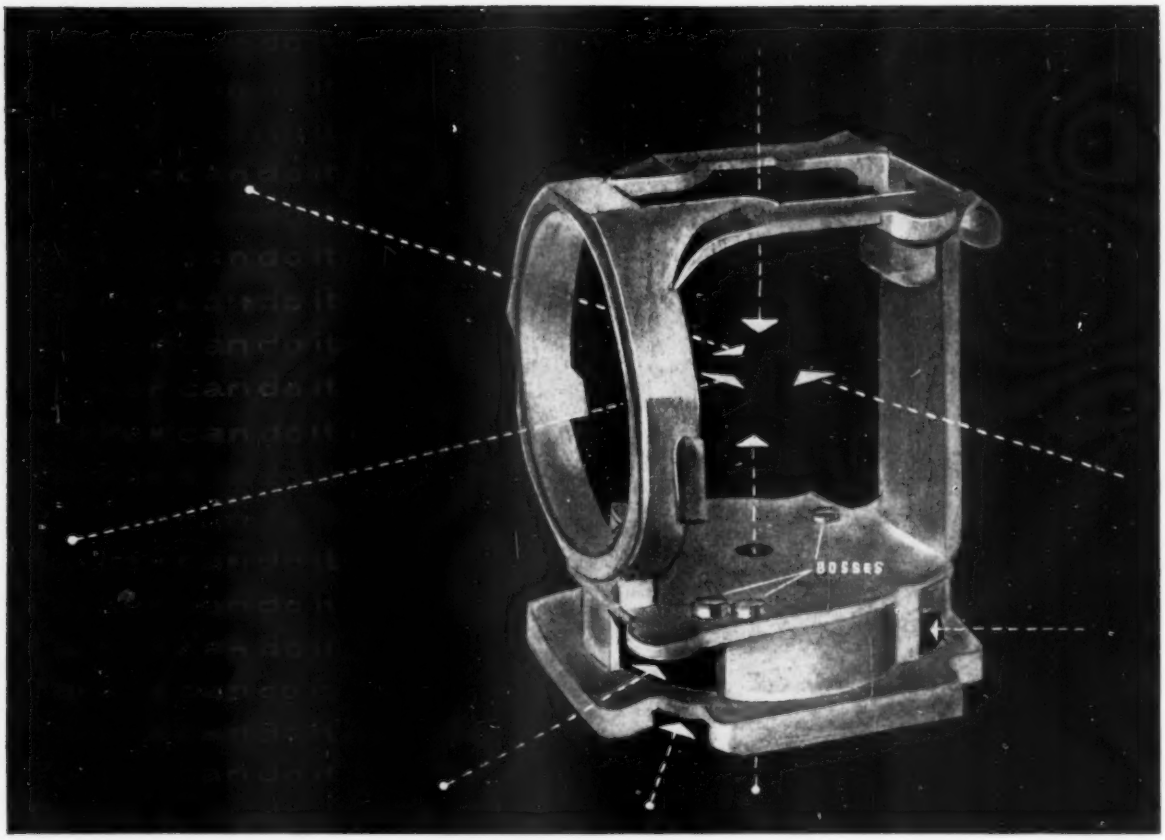
STROMAN FURNACE & ENGINEERING CO.

DIVISION OF THE PETERSEN OVEN CO. • FRANKLIN PARK, ILL.



Coring Too Intricate For Die Casting?

----not at Parker

PARKER SALES ENGINEERS

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Warren G. Olson • 420 East Linn Street

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Hodgson-Geisler Co. • 18917 James Couzens

GIRARD, Penna.
Daniel F. Marsh • 35 Chestnut Street

LONG BEACH 11, California
R. W. Fletcher • 2803 Loomis Avenue

PHOENIX, Arizona
Fred B. Larsen • 6108 North 11 Avenue

ST. LOUIS 8, Mo.
Frank May • 4378 Lindell Boulevard

SYRACUSE, N. Y.
J. C. Palmer • 712 State Tower Bldg.

WILTON, Conn.
Girard L. Palmer • Belden Hill Road

WINTER PARK, Florida
Duane P. Davis • 110 South Orlando Avenue
Box 26

Because of intricate coring—together with internal bosses—sand casting seemed to be the only way to make this part. Necessary finish machining, however, boosted costs too high.

Then Parker die casting engineers tackled the job—and licked the coring problem. The result: a part with greater density, closer tolerances, better surface finish, no finish machining and—best of all—*much lower cost per unit.*

Here is just another example of the way Parker-engineered die castings save you money.

Parker has been a leader in die casting for over 50 years—an old hand with new ideas. This skill and experience can solve problems—and save money—on *your* component parts. Just call the nearest Parker sales engineer or send your prints to the factory direct.

Parker White Metal Company • 2153 McKinley Ave., Erie, Pennsylvania

PARKER

high pressure
ALUMINUM and ZINC
die castings
POWDERED METAL PARTS

For more information circle No. 102 on the Reader Service Card

In our 50 years of manufacturing dispersions of colloidal graphite, we've seen the unique anti-friction properties of this basic material make lubricating problems disappear as if by "black magic". As an additive to lubricating oils and greases, as a parting agent in many kinds of casting and as a dry-film lubricant in diverse fields of metal working . . . in application after application . . . it has proved literally more valuable than gold.

Dr. Edward Goodrich Acheson's invention of colloidal graphite over 50 years ago has been followed by a constantly expanding program of fundamental research and product development. Today, with over 50 different dispersions already in use, three laboratory groups at Acheson are pressing toward perfection of whole new families of dispersions and their applications.

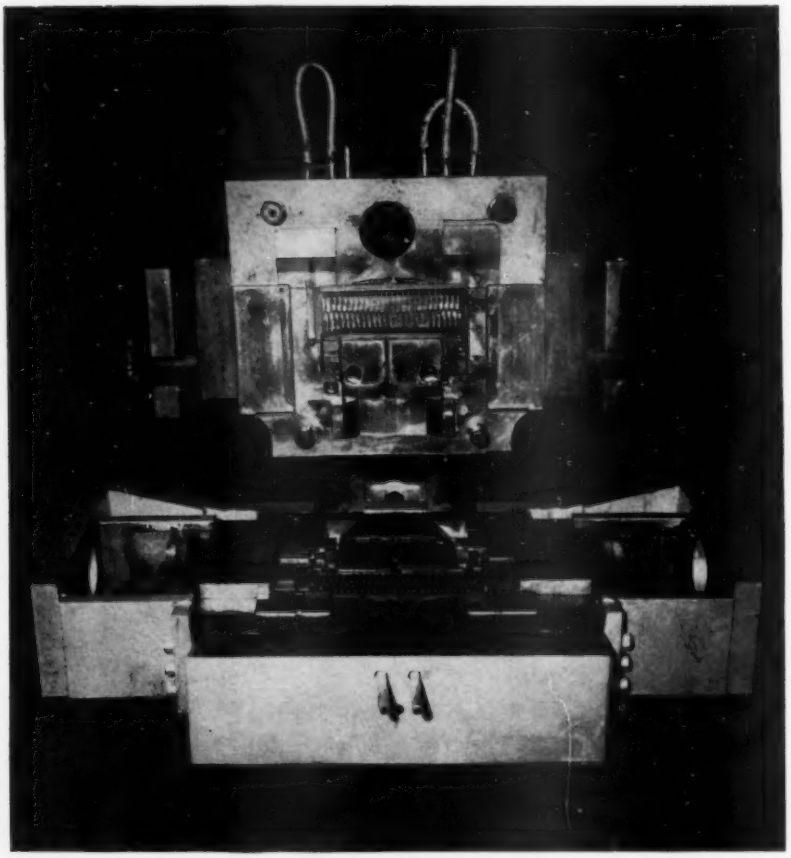
The custom dispersing of solids requires specialized facilities and production techniques. Why not take advantage of Acheson's 50 years of leadership in this field?

You will be interested in the number of different dispersed solids, in addition to graphite, that are being used successfully today in industry. Our Products List gives you, in quick-reading chart form, a résumé of Acheson 'dag'® brand dispersions and their typical applications. Send for your copy. Address Department PMM-18.

ACHESON *Colloids Company*
PORT HURON, MICHIGAN
A division of Acheson Industries, Inc.
Also Acheson Industries (Europe) Ltd. and affiliates, London, England

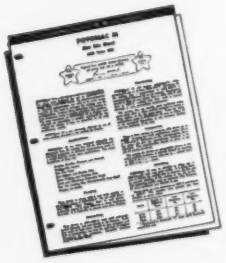
Offices in:
Boston • Chicago • Cleveland • Dayton • Detroit • Los Angeles • Milwaukee
New York • Philadelphia • Pittsburgh • Rochester • St. Louis • Toronto

For more information circle No. 4 on the Reader Service Card



No matter what your DIE-CASTING JOB may be...

Accuracy calls for POTOMAC M Hot Work Die Steel



Write for BLUE SHEET on POTOMAC M

This concise four-page folder gives all needed handling and shop treatment details on Potomac M. Included is certified laboratory information on physical characteristics, and complete data on forging, annealing, hardening, tempering, etc. *Ask for your copy.*

ADDRESS DEPT. PM-1

In the precision casting of aluminum, POTOMAC M Hot-Work Die Steel is especially favored as the material for die-casting dies because its properties help assure accuracy of the steel itself *after* heat treatment. Die makers have found that size changes are held to a minimum. Dimensional stability is thus the *first* contribution that POTOMAC M makes to accuracy.

Production accuracy of the die after it is in service is maintained also by the resistance of POTOMAC M to wear, to heat checking, and to metal wash.

Allegheny Ludlum makes a complete line of steels for hot-work tooling of various kinds—so, whether your need is the mass producing of duplicate parts or fabricating a few of them, call up or write "A-L" every time for hot-work counsel or service or both. Just tell us your requirements.

● *Allegheny Ludlum Steel Corporation, Henry W. Oliver Bldg., Pittsburgh 22, Pa.*

For nearest representative, consult Yellow Section of your telephone book.

For complete **MODERN** Tooling, call

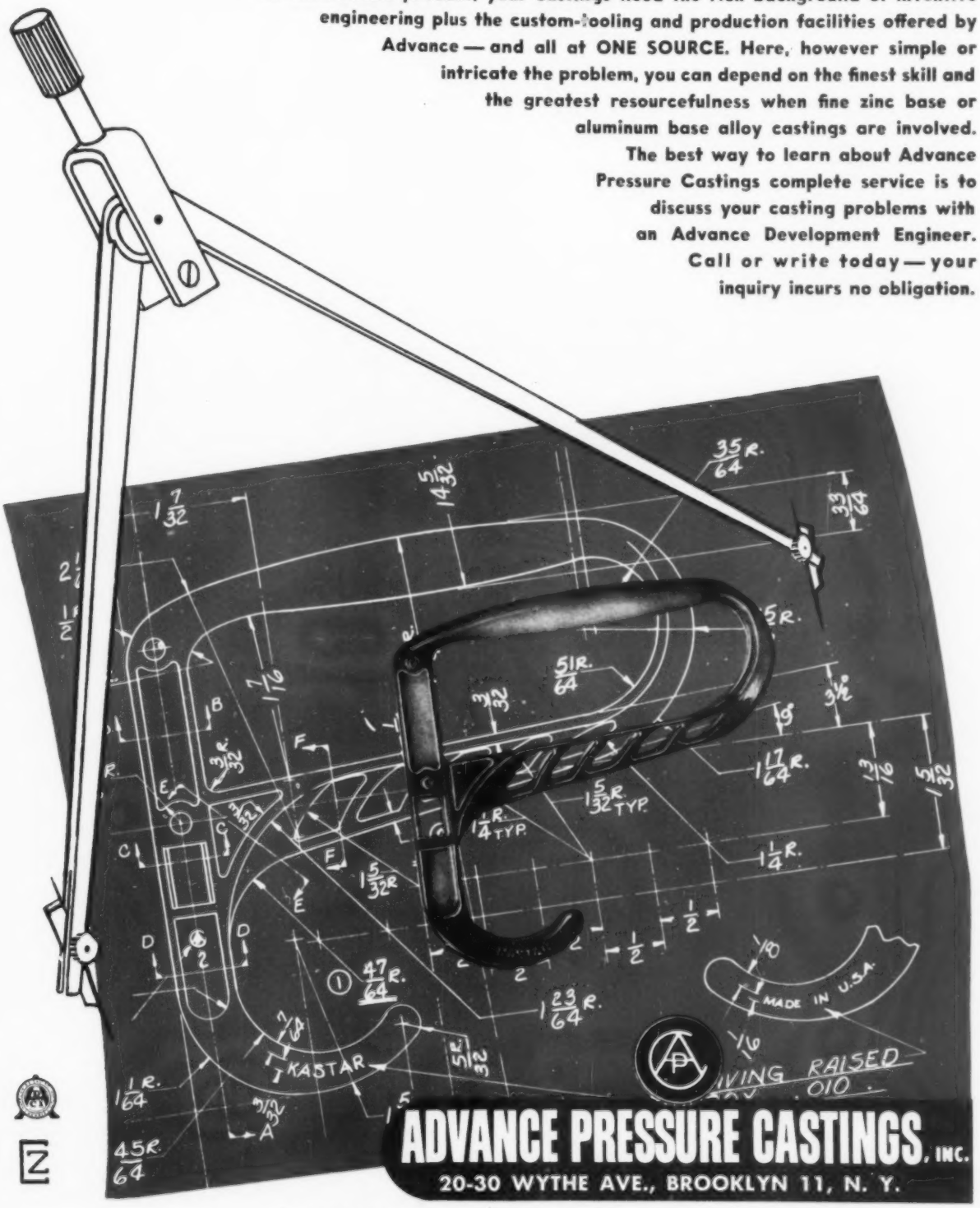
Allegheny Ludlum

AL® FINE TOOL STEELS SINCE 1854

For more information circle No. 7 on the Reader Service Card

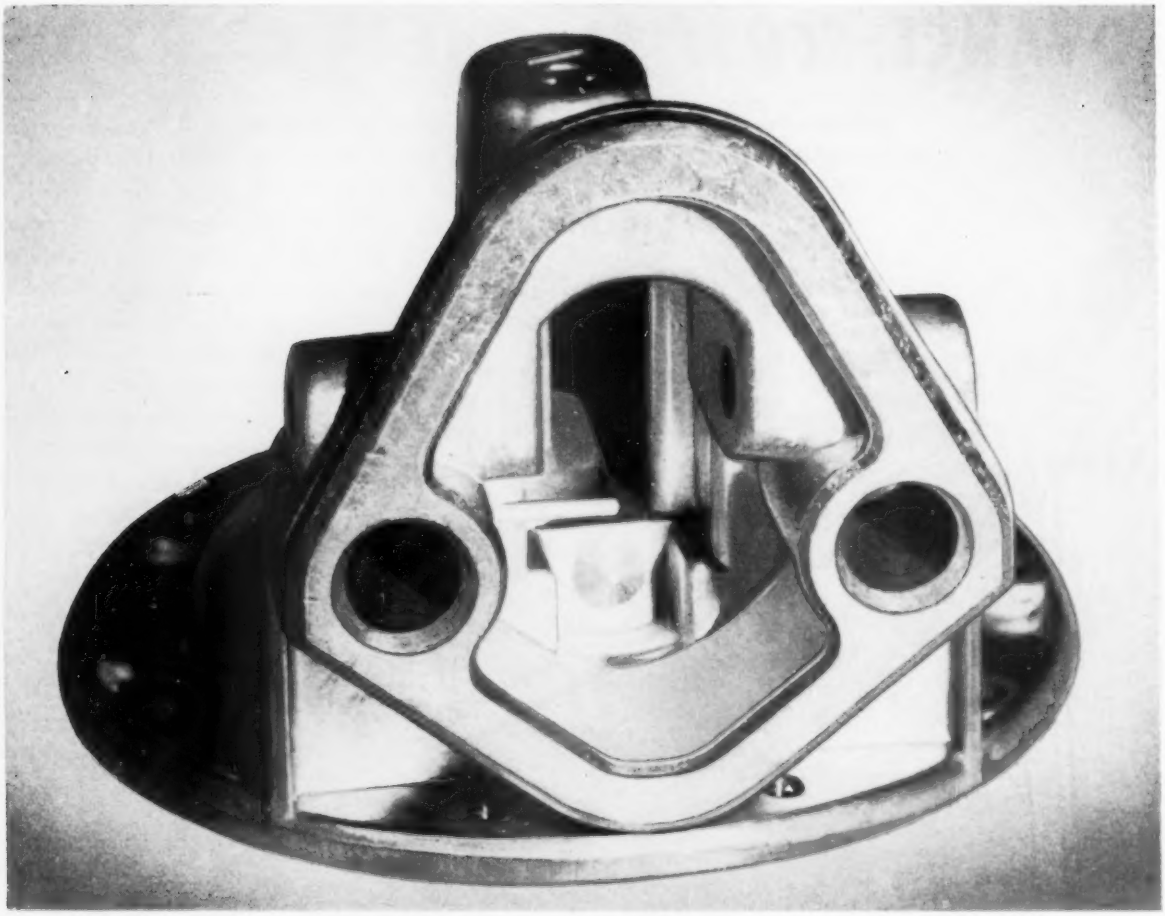
ADVANCE "*COST-PLANNED*" CASTINGS

Advance Pressure Castings can take your product at any point in its development and carry it through to finished form. Every step of the way from blueprint to delivery of the finished product, your castings need the rich background of inventive engineering plus the custom-tooling and production facilities offered by Advance — and all at ONE SOURCE. Here, however simple or intricate the problem, you can depend on the finest skill and the greatest resourcefulness when fine zinc base or aluminum base alloy castings are involved. The best way to learn about Advance Pressure Castings complete service is to discuss your casting problems with an Advance Development Engineer. Call or write today — your inquiry incurs no obligation.



ADVANCE PRESSURE CASTINGS, INC.
20-30 WYTHE AVE., BROOKLYN 11, N. Y.

For more information circle No. 24 on the Reader Service Card



DIE-CAST WITH TADANAC ZINC...

"but what is it?"

The die-casting industry of today is producing more and more complicated shapes, never before thought to be possible. Our illustration is typical of such shapes . . . using Tadanac Zinc of course, because it's ideal for low temperature high speed operation, and has the essential tensile strength and freedom from corrosion.

Tadanac Brand's consistent high purity, its guaranteed supply position backed by one of the world's largest zinc producers and a prompt delivery service, make it a preferred brand by die casters.

If you require any information or assistance regarding your Zinc die-casting operations, write to our Metal Sales Division, where your inquiries will be promptly attended to by our Technical Sales Service Department.

The photo shows part of an Automobile Fuel Pump Casing

COMINCO

THE CONSOLIDATED MINING AND SMELTING COMPANY OF CANADA LIMITED

METAL SALES DIVISION: 215 ST. JAMES ST., WEST, MONTREAL, QUEBEC, CANADA

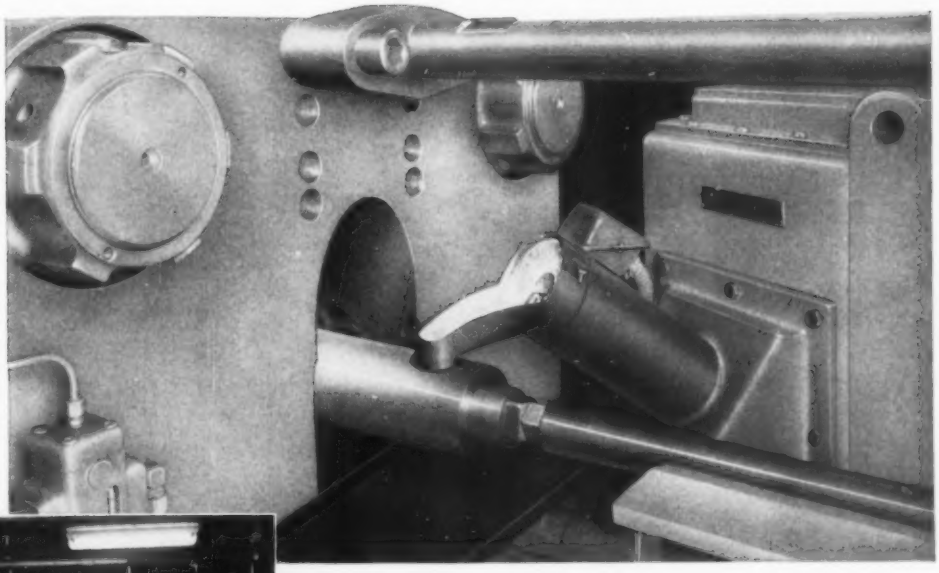
Exclusive U.S. Sales Agent: The American Metal Company Ltd., 61 Broadway, New York 6, N.Y., 1 N. La Salle St., Chicago, Ill.

S7145-T

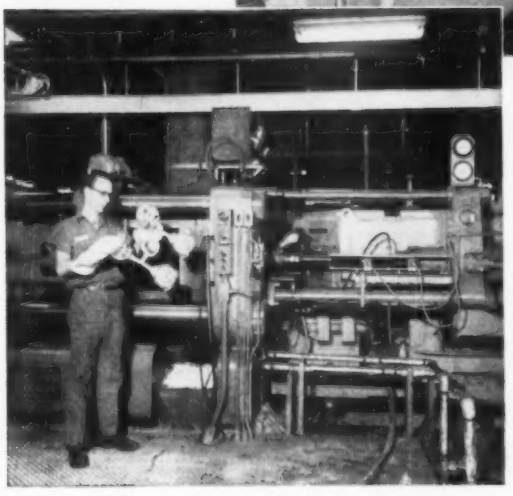
TADANAC ZINC SHAPES THE THINGS TO COME

For more information circle No. 40 on the Reader Service Card

DIE CASTERS
ideal for automatic ladling

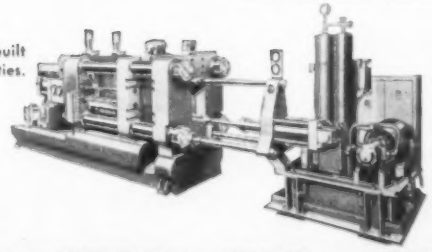


A 4-cavity end bracket gate being die cast on an H-P-M 600-ton machine at Century Electric Co., St. Louis. A 5 lb. shot on a 20 sec. continuous cycle.



H-P-M DESIGN PUTS THE SPOUT WHERE IT BELONGS

Automating the time-consuming chore of ladling metal into the metal well relieves the operator of a hot and fatiguing operation and increases total shots per hour. The above close-up of an H-P-M 600-ton machine at Century Electric Co. shows that H-P-M's design allows the furnace spout to be placed where it must be for successful operation. This is just one of many improvements incorporated in H-P-M die casting machines that result in better, faster, low-cost production. Century Electric, a 100% H-P-M die casting operation, has used H-P-M's for casting motor rotors, end brackets and other parts for years. Let us send you the facts on H-P-M's line of heavy duty die casting machines. Write today.



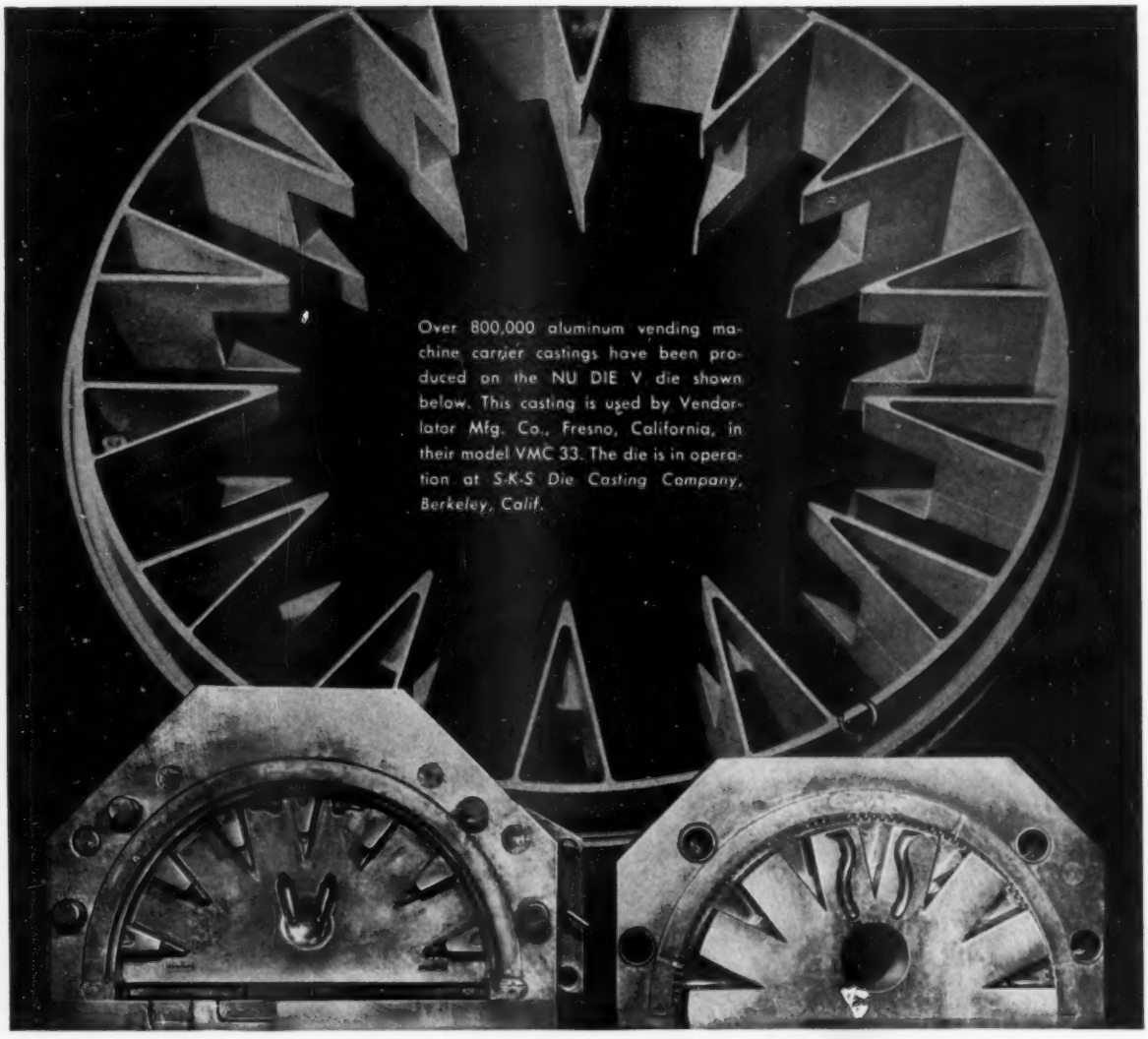
H-P-M Cold chamber machines are built in 200, 400, 600 and 800 ton capacities.

H819

THE HYDRAULIC PRESS MFG. COMPANY

A DIVISION OF KOEHRING COMPANY · MOUNT GILEAD, OHIO, U. S. A.

For more information circle No. 69 on the Reader Service Card


Over 800,000 aluminum vending machine carrier castings have been produced on the NU DIE V die shown below. This casting is used by Vendorlator Mfg. Co., Fresno, California, in their model VMC 33. The die is in operation at S-K-S Die Casting Company, Berkeley, Calif.

Die of Crucible NU DIE V still in service after 800,000 "shots"

The die shown above, made of Crucible NU DIE V die casting die steel, has been in operation 10,000 hours. It has produced over 800,000 "shots" with no special maintenance required. And the die is still in excellent condition.

Long, continued runs like this develop high die heat of 700/900 F but the NU DIE V die has shown a minimum of heat checking, and is still giving dependable service. One good reason is that Crucible NU DIE V is made to die casting steel quality. And each piece is ultrasonically inspected.

Crucible NU DIE V, as well as CSM_2 for zinc die casting and holder blocks for aluminum, are available from local warehouse stocks — in 438 sizes — 1" to 40" wide, $\frac{3}{4}$" to 15" thick. When you want quality die steels fast, call Crucible. *Crucible Steel Company of America, The Oliver Building, Mellon Square, Pittsburgh 22, Pa.*

CRUCIBLE first name in special purpose steels

Crucible Steel Company of America

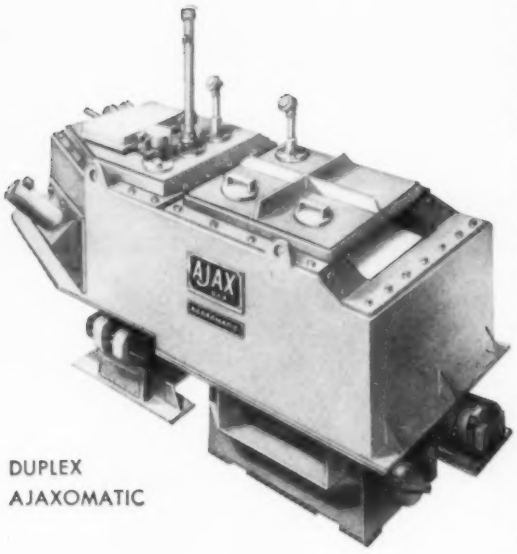
Canadian Distributor—Railway & Power Engineering Corp., Ltd.

For more information circle No. 43 on the Reader Service Card

CAN WE STILL AFFORD HAND-LADLING?

AJAXOMATICS

bring automation to die casting



DUPLEX
AJAXOMATIC

The Duplex AJAXOMATIC melts aluminum pig and gates right at the die casting machine. By pushing a button the operator initiates the complete casting cycle: the die closes and the Duplex AJAXOMATIC pours the exact required amount of molten metal directly into the cold chamber. The operator just removes the finished casting at the end of the cycle.

Automation, however, is only part of the AJAXOMATIC story. The Duplex AJAXOMATIC also gives assurance of consistent quality. The quality of a finished casting begins with the proper melting of the metal. 60 cycle induction with its two basic features of internal heating and electromagnetic stirring is used exclusively in the Duplex AJAXOMATIC. Here are the unique characteristics of the Duplex AJAXOMATIC:

Precision temperature control — at low temperature	No supply ladle system or hand ladles
Alloy uniformity — no segregation	Precise weight of automatic pour
No gas porosity	Comfortable working conditions
Low metal loss	Low maintenance

The standard Duplex AJAXOMATIC is rated 120 kw to produce 500 lbs per hour of castings ranging from ½ lb to 30 lbs. Other AJAXOMATICS are available to suit a wide range of production requirements, including units supplied from central melting systems. May we have an opportunity to study your requirements?

AJAX USA

60 CYCLE INDUCTION MELTING

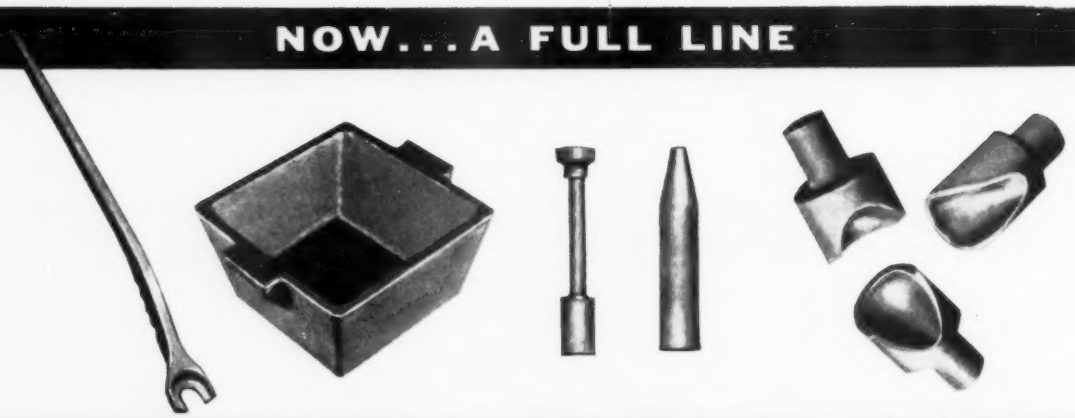
ENGINEERING CORPORATION

TRENTON 7, NEW JERSEY

Associated Companies: Ajax Electrothermic Corporation Ajax Electric Company

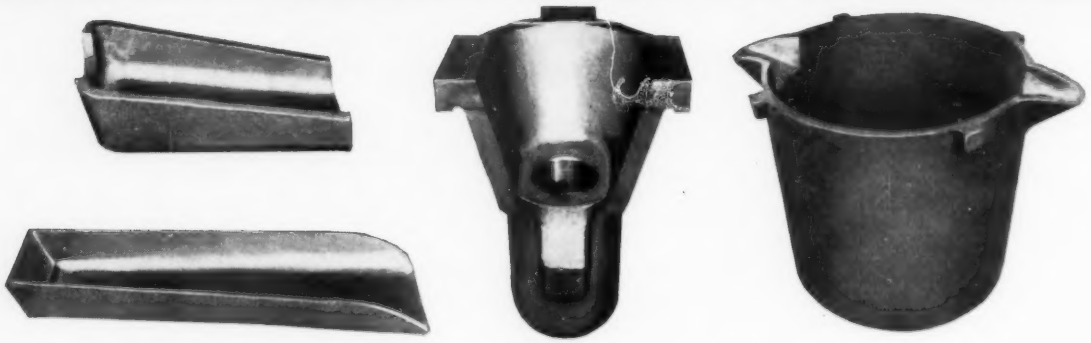
For more information circle No. 6 on the Reader Service Card

NOW...A FULL LINE



OF DODGE CUSTOM-MADE

STEEL PARTS AND ACCESSORIES



DODGE STEEL COMPANY

Finished Products Division

6501 Tacony Street • Philadelphia 35, Pa.

THE MOST IMPORTANT ALLOY IN A STEEL CASTING IS QUALITY

For more information circle No. 48 on the Reader Service Card

PMM LETTERS

the readers' forum

FORECASTS

In the November issue of PRECISION METAL MOLDING there appeared an article entitled "Forecast of Powder Metallurgy Industry." This is one of the better articles that I have read in quite a long time in connection with any type forecast for our industry.

We would like to secure ten reprints of this article. —J. F. H., vice president.

INFORMATION PLEASE?

Kindly inform us who manufactures the Automatic Stud Driving Unit described on page 59 of your October issue. — J. C. G., president.

Could you furnish us a listing of those who make permanent mold machines? — J. C. M.

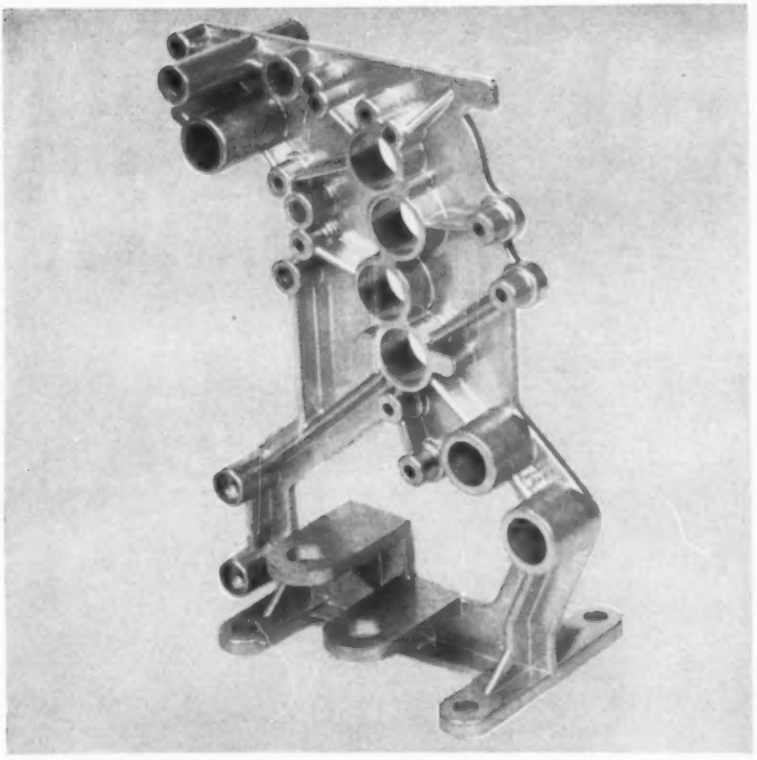
Will you kindly forward to the attention of the writer several sources for a vertical die casting machine. — P. F. F., buyer.

We are always glad to furnish our readers with any information we have on sources of products, methods and equipment. — Ed.

BLACK ANODIZING

We would appreciate receiving tear sheets of the article "Here Are 10 Steps in Black Anodizing Aluminum Die Castings" which appeared in the November 1957 issue of PRECISION METAL MOLDING. — S. H.

As long as our supply lasts we always furnish tear sheets of any article that has appeared in PMM. — Ed.



What other process could do it so well?

All things considered, there's really only one *best* way to produce this typical die casting application.

When you figure that it must be built at the lowest possible unit cost, must use a production method that is highly flexible to accommodate the unusual shape, and must maintain a variety of close tolerances . . . only die casting *could* do the job.

Working closely with Twin City engineers, this manufacturer *designed* for die casting to get the maximum out of the process. By thinking in terms of die casting right from the drawing boards he eliminated many production and finishing jobs, saved on unit costs, saved on machining.

Possibly you're producing a part by some more costly, less flexible, less accurate process than die casting. If you think that might be true, contact Twin City Die Castings Company. Twin City engineers can probably save you money. They have for hundreds of customers.

...only DIE CASTING can

✓ cut your costs

✓ offer such flexibility

✓ provide such accuracy

FOR PROOF... CALL, WRITE OR WIRE:

TWIN CITY DIE CASTINGS CO.

3351 TALMAGE AVENUE S. E. • MINNEAPOLIS 14, MINNESOTA

TELEPHONE MIDWAY 6-7528

DIE CASTING RESEARCH FOUNDATION PARTICIPANT

For more information circle No. 122 on the Reader Service Card

ZINC DIE CASTINGS REPLACE ALUMINUM

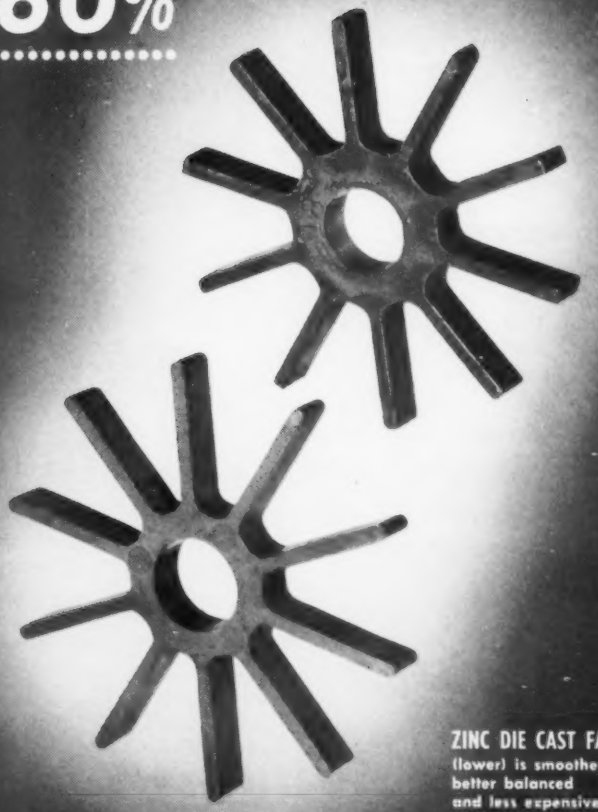
in Redesigned Motor Fan

REDUCES COST OVER 60%

Conversion to zinc die castings from aluminum sand castings enabled Baldor Electric Co., St. Louis, Mo. to reduce material and labor costs on its fans by as much as 61%, and speed up production as well. The fan is used to cool the manufacturer's line of induction motors.

The aluminum sand castings previously used were often irregular and unbalanced, and required expensive finishing and machining operations.

The fans, die cast in zinc by A. B. Mueller Co. of St. Louis, Mo., requires no protective finishing because of the inherent corrosion resistance of zinc, and most secondary operations have been eliminated. The shaft hole diameter of the fan is held within ± 0.005 in. as cast — additional proof that of all the metals commonly used in die casting, zinc alloys rate highest in dimensional accuracy.



ZINC DIE CAST FAN (lower) is smoother, better balanced and less expensive to produce than aluminum sand cast fan.

DIE CASTING is the Process

ZINC, the Metal

BUNKER HILL, THE PREFERRED ZINC

EASTERN SALES AGENTS • ST. JOSEPH LEAD COMPANY • 250 PARK AVENUE, NEW YORK 17

BUNKER HILL 99.99+% ZINC

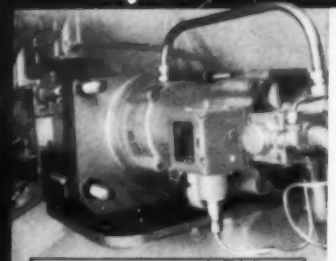
SALES OFFICE FOR PACIFIC COAST • THE BUNKER HILL COMPANY • 660 MARKET STREET, SAN FRANCISCO 4, CALIF.

Introducing the machine that will revolutionize small parts diecasting!

The DCMT RAM AUTOMATIC

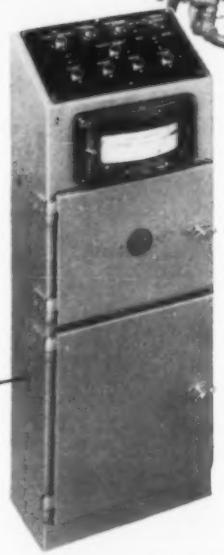
60 TON LOCK . . . 1 LB. CAPACITY DIECASTING UNIT

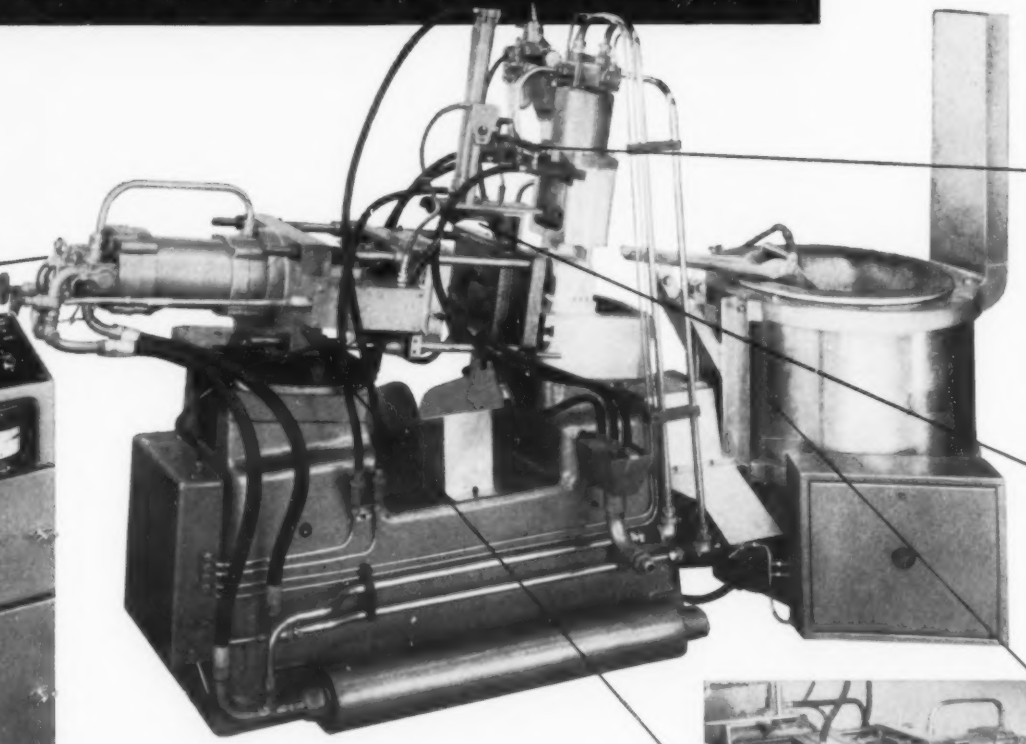
Requires no operator—reaches production averages up to 1500 shots per hour

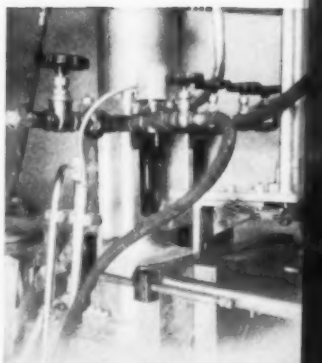


FLASH SENSING "DI-SAVER" SAFETY SYSTEM. This ultra sensitive pressure switch with infinite adjustment in series with a wide tolerance microswitch, can feel foreign matter between the dies as they lock up. Any unejected castings or other foreign matter will immediately cause the die to retract and stop the cycle! An additional pair of sensitive microswitches assures die lock at each corner, and prevents injection in case of flash or dirt causing the machine to recycle and reclean the dies.

SEPARATE ELECTRONIC PORTABLE CONTROL UNIT. Contains 3 sets of cycling controls, "Manual", "Single Cycle Automatic", and "Full Automatic". Timer panel plugs in for quick disconnect. All operating control boxes are mounted outside of machine base for easy maintenance. Machine can continue to be operated manually even when automatic timing controls are removed for maintenance.





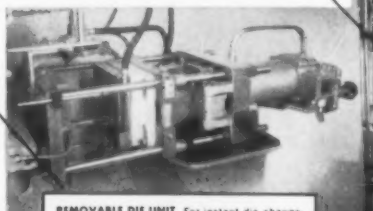


AUTOMATIC DIE TEMPERATURE CONTROL. Solenoid-operated thermostat automatically delivers the proper amount of water for die and sprue cooling to keep dies in proper thermal balance.

AUTOMATIC DIE CLEANING AND SELF-LUBRICATING MECHANISM. Tied into the machine cycle is a set of phosphor bronze brushes in adjustable segments to fit any die contour.

Brush wipes die on down stroke. Die is again wiped up on stroke.

Brush device can be set at any angle to miss core mechanisms, either or both die halves are automatically lubricated as dies start to close.



REMOVABLE DIE UNIT. For instant die changeover, all connections to the die unit are quick-disconnect couplings. Elimination of the major cause of machine "down time", whether it results from die changeover or maintenance, is accomplished by keeping one spare die unit with next die mounted in place to service a bank of machines.

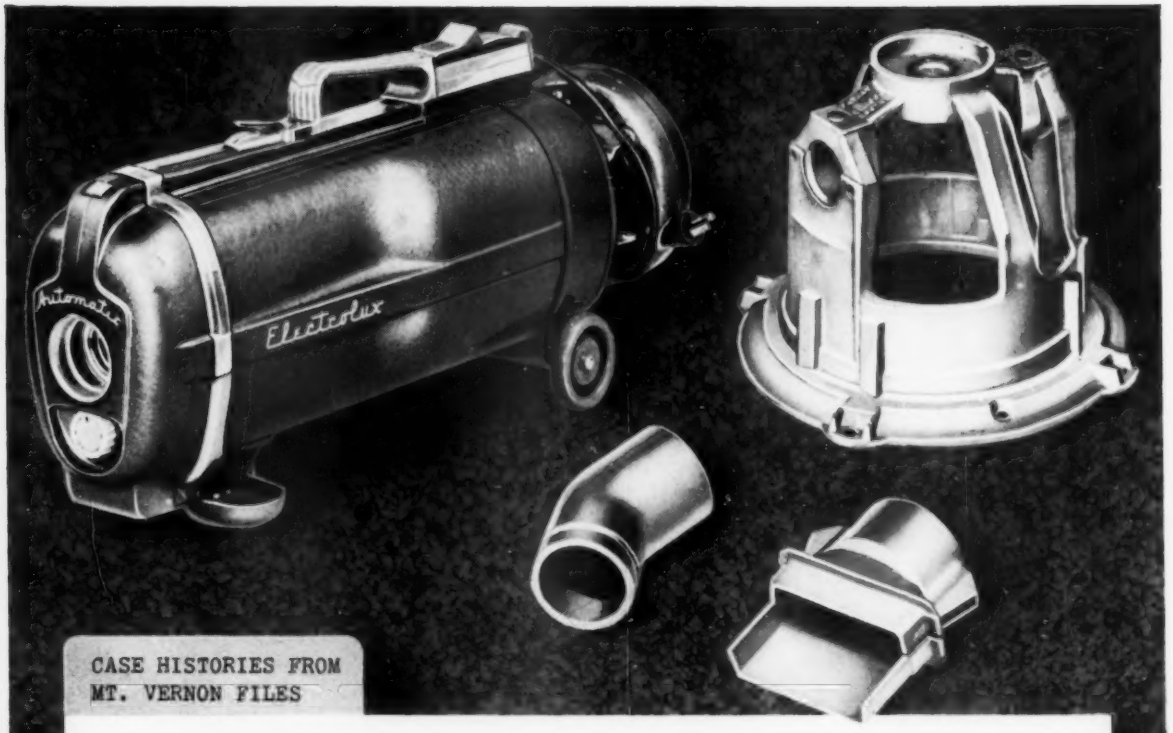
AUTOMATIC LADLING. When the pot level falls below a set height, the ladler is tripped automatically. Gently and without turbulence, it refills the machine pot from the preheat furnace. Ladle mechanism is made of a heat and corrosion resistant alloy which will not contaminate pot metal.

The only fully automatic small diecasting machine that produces "hardware finish" zinc castings up to 1 lb. at production averages often exceeding 1500 shots per hour! This remarkable new diecasting machine requires no operator.

For information, write Dept. DA368

DCMT SALES CORPORATION, PORT WASHINGTON, NEW YORK

DIVISION OF BRITISH INDUSTRIES CORPORATION



CASE HISTORIES FROM
MT. VERNON FILES

"Brain" stops new Electrolux automatically!

The minute this new Automatic Electrolux Cleaner has absorbed so much dirt it can no longer operate at high efficiency, it stops and the cover pops open. Replacing the sealed paper dust bag with a new one sets it up for further operation. It is one of several exclusive Electrolux features which includes 20% greater suction power than any machine the company has ever made. This is due in part to the increased speed and power of its electric motor.

The additional power and the automatic features of this new cleaner were not, however, achieved at the expense of added weight, because it is remarkably light for an appliance of such power and flexibility. By using die castings for the motor frame, elbow and adapter, both weight and manufacturing costs were kept down. As you can see these parts are complex. The motor frame alone, for example, involves apertures of various sizes and shapes, lugs, curved members, straight members, flanges, fillets, vanes and shoulders all combined into a very lightweight yet extremely rigid, strong unit. The other parts, although smaller, are also "toughies". But die casting is the most economical method of producing these intricate parts which combine strength with light weight and holding to such close tolerances that little or no machining is reqiured to finish them.

Mt. Vernon can help you make the most of these and other die casting advantages by a complete four-fold service of: (a) consultation—to help with design and production problems; (b) die making—on modern tool and die equipment handled by skilled personnel; (c) castings—aluminum and zinc, guaranteed "on grade" at all times; (d) machining facilities—for handling any machining operations your castings may require. As in the case of Electrolux, a switch to die castings may profit you tremendously. Let's talk it over.

MT. VERNON
DIE CASTING CORP.
STAMFORD, CONNECTICUT

SALES REPRESENTATIVES

STAMFORD, CONN.—Mr. Anker Anderson, Cascade Road
GUILDERLAND, N.Y.—Mr. David H. King, 75 Willow St.
BALTIMORE, MD.—Carey & Gordon, 919 St. Paul St.
CLEVELAND, OHIO—Mr. Grand Eller, 6 East 194th St.
BROOKLYN, N.Y.—Mr. Robert V. Moore, 2317 Plumb 2nd St.
EAST ORANGE, N.J.—Mr. George E. Hahl, 37 So. Munn Ave.
ROCHESTER, N.Y.—Mr. William Sauers, 101 Briarcliff Rd.
SKANEATELES, N.Y.—Mr. Jerome J. Theobold, 9 E. Genessee St.
BALA-CYNWYD, PA.—Mr. G. T. McMaster, Llanberris Apts. C-1
BOSTON, MASS.—Mr. James Cleary, 61 Exeter Street

For more information circle No. 90 on the Reader Service Card

Few melting cost factors are more important than

THE FIT OF THE FURNACE

Eclipse top-firing type double chamber dry-hearth furnace

Our experience proves that the *fit* of the melting furnace — the way its design features mesh with the rest of your operation — is a *major* factor in the size of your net profit. That's why efficient Eclipse crucible and double chamber dry-hearth furnaces are offered *in such a wide variety of firing, loading, pouring, and dipout arrangements*. And each furnace is available in *a range of sizes bracketing practically all logical users* of any given type. In short, you easily select the Eclipse furnace you need for your plant arrangement, space requirements, personnel, production rate, etc., just as if you had designed it yourself! How closely have you considered this approach to cost-cutting? Discuss your furnace *fitting* problem with the highly experienced Eclipse representative . . . especially if your operation has grown or changed in recent years.

Eclipse hydraulic tilting nose-pour crucible furnace for melting all types of nonferrous alloys.

Eclipse side-firing double chamber dry-hearth furnace

Eclipse hydraulic-tilting double chamber dry-hearth furnace

Eclipse®

INDUSTRIAL FURNACE DIVISION

ECLIPSE FUEL ENGINEERING COMPANY
1123 Buchanan Street, Rockford, Illinois
ECLIPSE FUEL ENGINEERING CO. OF CANADA, LTD.
20 Upjohn Road, Don Mills, Ontario

SEND new Bulletin C, illustrating and describing 9 Eclipse crucible and double chamber dry-hearth furnaces that offer custom-design efficiency for most metal-melting operations.

NAME _____

COMPANY _____

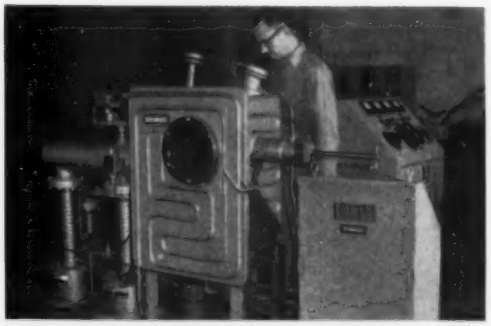
STREET _____

CITY _____ STATE _____

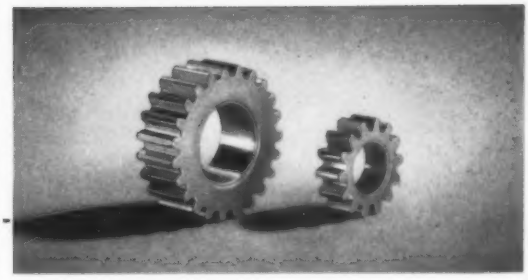
For more information circle No. 52 on the Reader Service Card

A section of the Supermet Division plant where miniature, close-tolerance gears and other parts are compacted to high density on Stokes presses.

OTHER STOKES EQUIPMENT



Stokes vacuum furnaces, available in a range of sizes, such as this Model 437-520, enable special alloying under vacuum, as well as the melting of metals susceptible to oxidation in normal atmosphere. Write for literature.



Enlarged 2½ times...the smaller steel gear is made to Commercial Grade 4 specifications, the larger one is made to Precision Grade 1 specifications. Both are pressed to 95% of theoretical density, are hardened to 30N64-69 specifications, and have tensile ratings of 130,000 psi.

Close-tolerance, powder metal parts pressed to high density at Supermet

Globe Industries, Inc., is the world's largest manufacturer of miniature precision motors. The Supermet Division, Dayton, Ohio, is a modern well-equipped powder metal pressing plant...supplies high-strength, close-tolerance gears for a variety of Globe's needs, as well as parts for other customers. When production of these precision parts was changed to powder metal pressing, substantial cost reductions were effected.

The Stokes equipment at Supermet includes one Model 294, two Model R-4's and two Model F-4's . . . with a third F-4 now on order. Some have already seen substantial service, yet all are regarded as "dependable machinery with very little down-time."

Typical of the Stokes line of equipment for powder metal pressing is the Model 640 . . . embodying such features as independent press adjustments and direct-reading calibrations, making it exceptionally easy to set up and to control from one centralized location. It, too, is designed for close-tolerance tooling and is uniquely suited for multi-level die work.

If you are now making metal parts by conventional machining methods, it will pay you to investigate the powder metal process and to call on the Stokes Advisory Service. This complete service can assist you in determining production costs . . . can handle complete laboratory production for sampling . . . includes design and fabrication of punches and dies, and recommendations for types of equipment. Write for complete information and literature.

Powder Metal Press Division
F. J. STOKES CORPORATION
5500 Tabor Road, Philadelphia 20, Pa.

FOR METAL-WORKING PLANTS

Vacuum plating, in Stokes Vacuum Metallizers, produces a bright, attractive, metallic finish at far lower cost than electroplating. A complete line of self-contained, centrally controlled systems is available. Write for literature.

STOKES

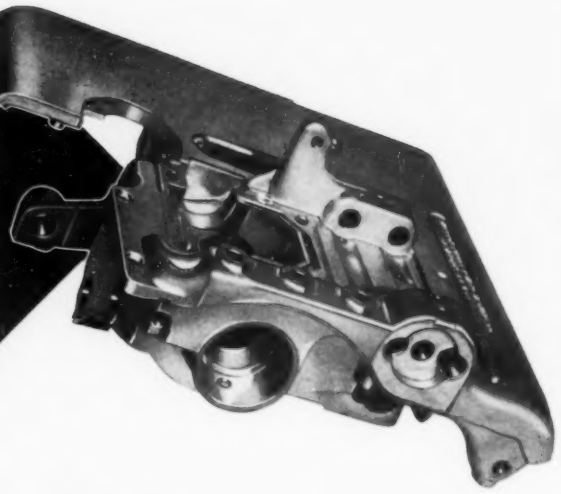
Circle No. 116 on Reader Service Card

There's a Good Reason

WHY

ZINC DIE CASTINGS

are so widely used –



at WILLCOX & GIBBS

it's COMPLEXITY

With eight knurled and threaded steel bushings, a steel bracket, a large, double, bearing frame, and a copper tube cast into the top frame as inserts, this is probably one of the most complicated ZINC Die Castings ever to come out of a die caster's shop. The result is COMPLEXITY with a purpose, and ZINC Die Casting takes complexity for granted.

This unbelievable complexity of shape was readily achieved in this sewing machine top frame through a single ZINC Die Casting. Willcox & Gibbs engineers incorporated features which would support dozens of critical parts to operate a mechanism moving at 5,500 rpm with incredibly fast starts and stops—and without vibration.

This rugged commercial sewing machine has to meet high performance demands for seaming, hemming, edging and serging operations at lightning-fast speeds—day-in, day-out utility—for fifteen years and more. Only ZINC Die Casting could provide these exacting requirements.

All sides of this top frame have numerous cored openings (the cores being pulled in four directions) that simplify assembly and help to make the "Superlock" sewing machine so efficient. There are many advantages in this ZINC Die Casting that may provide answers to some of your production problems. Send for our free folder "Zinc Die Castings" and then see a commercial die caster.

THE NEW JERSEY ZINC COMPANY 160 Front Street, New York 38, N. Y.

The research was done and the Zamak die casting alloys were developed with

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ZINC

FOR DIE CASTING ALLOYS

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Everything that adds up to the finest in modern die casting . . .

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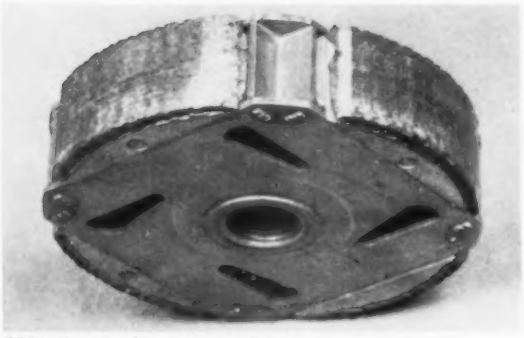
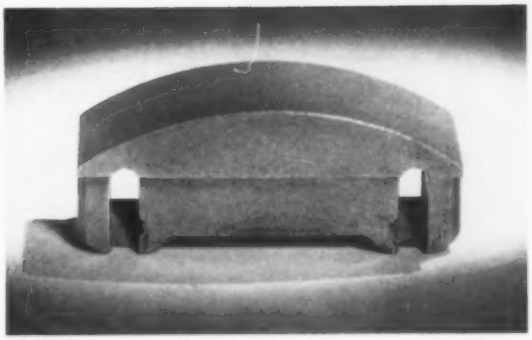
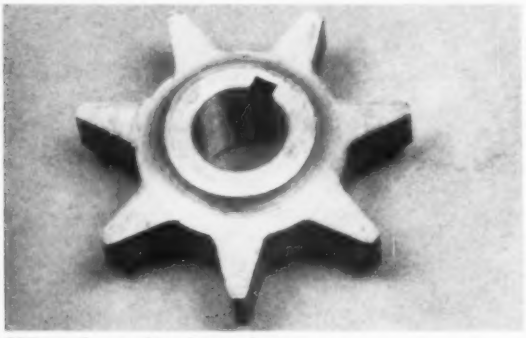


OLD asbestos shoe once used.



NEW sintered iron shoe.



OLD costly machined sprocket.

NEW sintered iron sprocket.

Using Sinterings Raised Part-Life 400%

SCHOLAR BANGS, Western Editor

NOT knowing how carefully an owner will treat a chain saw, McCulloch Motors Corp. of Los Angeles, Cal., built one designed to stand up under rough treatment and minimum maintenance.

They switched to sintered metal for the driving sprocket and clutch-shoes on their lightweight model D.44.

The company also saved money on costs.

The original clutch had four asbestos liners and brought complaints of liner-bond failure. For this reason, even though the part's life span was as good as McCulloch's competitors, it did not satisfy their engineers because of these costly assembly operations:

1. Preparing liner-bond adhesive.
2. De-greasing metal surfaces to receive adhesive.
3. Warming parts to receive adhesive.
4. Placing liners.
5. Baking shoe and asbestos liner.

The asbestos liners were replaced by four iron sinterings, a substitution that has apparently made everybody happy including the chain-saw users who now get more for their money.

SINTERED SHOES

Life increase 400%
Production cost less 47%

There was an unlooked for gain in the switch to sintered shoes: better lubrication in sliding areas due to the oil-pickup characteristics of sintered metal.

As might be expected, success in the first try led McCulloch's engineers into exploration of other areas in which sinterings might save money and give better wear.

They focused attention on the saw's driving sprocket, a machined part which drove the chain-teeth.

Recommendation: Test a sintered iron unit which might replace the machined sprocket.

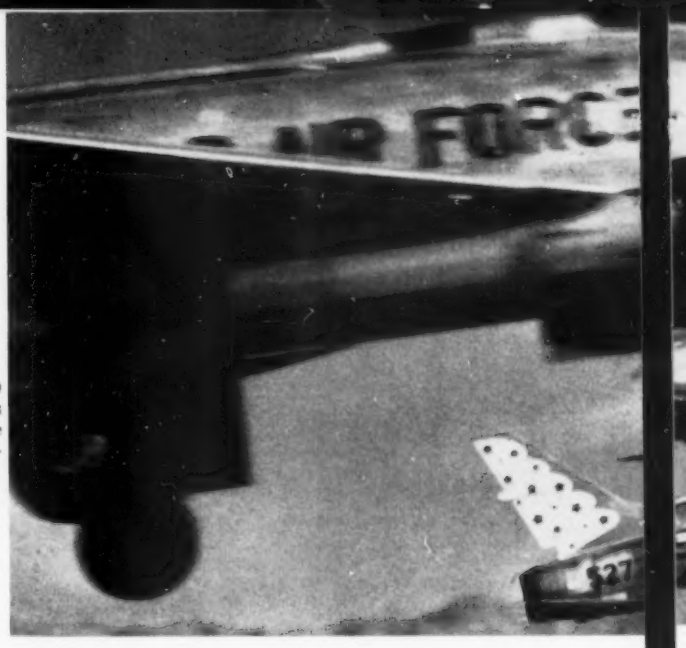
Density of the sintered sprocket was between 93% and 95%, lighter than the machined part, but results were surprising.

SINTERED SPROCKETS

1. Life Expectancy *increased* 10% to 20%.
2. Manufacturing costs *reduced* by 43%.

EXPERT who gives us facts on future needs of investment castings in missiles and planes, author A. H. Langenheim. *(WPAFB Photo)*

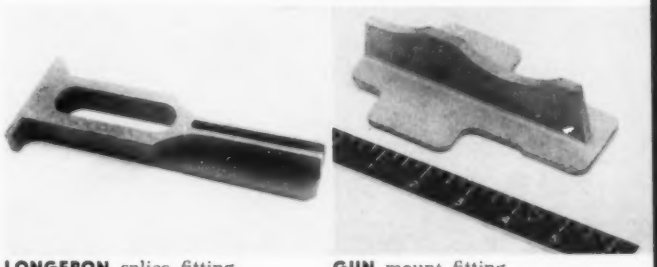
THUNDERBIRD photo shows planes like those which use investment cast parts. *(Official U.S. Air Force Photo)*



What Will Be the Future of Investment

By A. H. LANGENHEIM*

AS TOLD TO CLIFF MILLER, Associate Editor



LONGERON splice fitting. **GUN** mount fitting.

AN interview with one of the best informed civilian staff members of the Manufacturing Methods Branch, Air Material Command, at Wright- Patterson Air Force Base.

Q: Mr. Langenheim, can you mention a few of the many uses of investment castings in aircraft and missiles?

A: Yes, there are: bomb supporting hooks, leading droop edge hinges, gun mount fittings, rudder actuator fittings, splice fittings, control surface hinges, and ground handling equipment. There are also a number of jet engine parts, such as buckets and vanes.

Q: Why use investment castings for the first group of parts?

A: They are usually cheaper because they need less machining and have greater dimensional accuracy. Also, there are many parts which cannot be made economically by any other process.

Q: Why use them as engine buckets and vanes?

A: Because accuracy is needed on airfoil surfaces, especially very thin, hollow-center vanes.

Q: How were hollow-center vanes once made?

A: Usually of sheet metal. Sheet stock was formed, bent over, and welded.

Q: What was wrong with these vanes?

A: When under load, a flutter was often detected. This was normally damped out by a casting because a casting's crystal structure absorbs vibration without passing it on. Sheet metal's fibrous structure sustains the vibration and conducts it.

The investment casting frequently gives the *best* product, closest to the finished size and shape.

Q: What types of castings are needed by American makers of military aircraft if their products are to be the best in the world?

A. Many more than we have now. I want to see one casting replace a bunch of assemblies, and do it with greater saving in weight and cost.

Q: What changes do you recommend?

A: New shapes. Many casting designers are still living in the 19th century and are using antiquated reference sources like the old fashioned catalogs of wrought steel shapes. Designers should adapt new systems to other forms.

Q: What wrought steel shapes are being used inefficiently?

A: For example. There is the ancient I-beam. It is used, habitually and traditionally right now, in cases where other shapes would be a lot more beneficial.

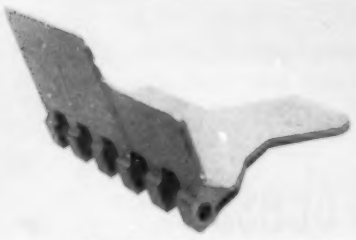
Q: Can you suggest a more desireable specific shape?

A: Yes. The tubular shaped beam has passed static and fatigue tests and been found stronger and lighter. Possibly, it is more expensive, but it makes airframe lubrication processes easier than the I-beam.

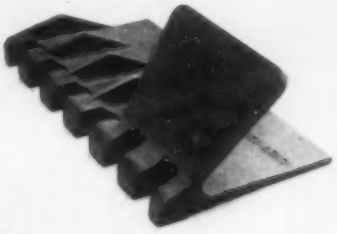
*Production Process Specialist, Wright-Patterson Air Force Base.

(Chance Vought Aircraft, Inc., photos)

Castings in Aircraft & Missiles?



LEADING edge droop hinges.



CONTROL surface hinge.

RUDDER actuator fitting.

Q: How about weight reduction? Is it possible to save money when weight is cut on missiles and aircraft?

A: Any weight reduction at all on missiles and military aircraft is very important.

As for figures, it boils down to this: The saving of one pound of weight in the construction of an airplane or missile is a saving of from $40 to $100 in the total cost of the aircraft.

Q: Can you explain how this works?

A: For example: 100 pounds off the weight of the engine means that lighter pylons can be used. This makes the wings themselves lighter. It goes on from there.

Q: What are the future needs of both missiles and manned aircraft?

A: They are extensive. Some of these castings cannot be produced at the present time. But first, I would like to see a 200 pound investment casting. Or one bigger than that.

Q: Is there a current disadvantage to investment castings?

A: They are small!

Q: What are the problems of making large castings?

A: They need large patterns; and large patterns lack strength.

Q: Can you suggest a remedy?

A: Yes. Perhaps frozen mercury or high strength plastic may be the one way to make large parts by investment. They are much more self supporting.

Q: And is it important that some way be found to make larger castings?

A: Yes. Absolutely! The future of the trade will have to be in larger castings if they want to improve their tonnage in the aircraft field.

Q: Can you analyse this for us?

A: Certainly. There is a greater potential use for investment castings than has ever been considered before. I believe that in the long run, investment castings will save a great deal of money.

Q: What do you need to make this possible?

A: We need new materials, with higher properties. We need and want more steel investment castings. And we want stronger castings.

Q: How strong?

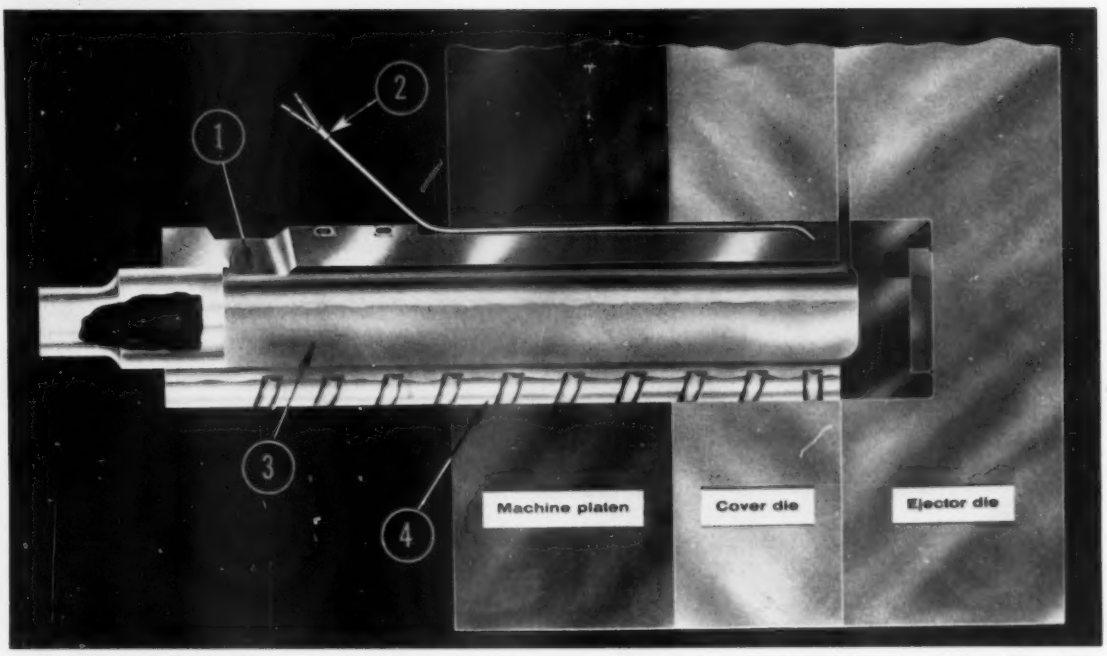
A: Today we are using steel castings with an ultimate strength-range from 180,000 psi to 200,000 psi. Our objective is to get a casting range from 280,000 psi to 300,000 psi, ultimate tensile strength.

Q: How do you think this will be achieved?

A: Money must be spent on research and development of high powered steel alloys! Maybe we need *new* heat treating cycles . . . or a *new* method of molding. Elongation should be worked up to a satisfactory figure.

But castings must be larger!

Continued on page 114



1. TEMPERATURE CONTROL on the shot sleeve of a cold chamber die casting machine. 1) pouring hole, 2) thermocouple, 3) molten metal and 4) water cooling. The sleeve shown is 6" in diameter.

Heat Control in the Die Casting Process

By A. F. BAUER*

IN the die casting process, molten metal is forced into a steel die to make the castings. Since the temperature of the molten metal as it enters the die is about 100° F above its melting point, and the temperature of the castings as they are removed from the die is 300° F to 600° F, the casting-die becomes a heat exchanger. The die casting process then is one of heat exchange and heat balance.

The amount of heat which enters the die with every shot is removed by radiation and conduction.

Temperature controls are used in the aging or heat treating of castings when this is done and in the heat treating of dies and tools.

TEMPERATURE CONTROL OF MOLTEN METAL

An indicating-controlling or indicating-controlling-recording potentiometer type instrument is generally used to control melting temperature. For pot melting, the thermocouple, in a cast iron sheath, is inserted in the pot of molten metal.

In reverberatory furnaces it is placed in the bath through an outside well. A proportioning type instrument is not practical in these cases because the furnace load varies too much.

During the run-in or tryout of a new reverberatory, an optical pyrometer can be used to check the temperature and in some cases a limit control should be used to prevent over-heating.

Thermal inertia of large masses is used in the die casting process. Relatively small amounts of new metal are added at one time to the casting machine holding pots. This helps to maintain constant pot temperatures.

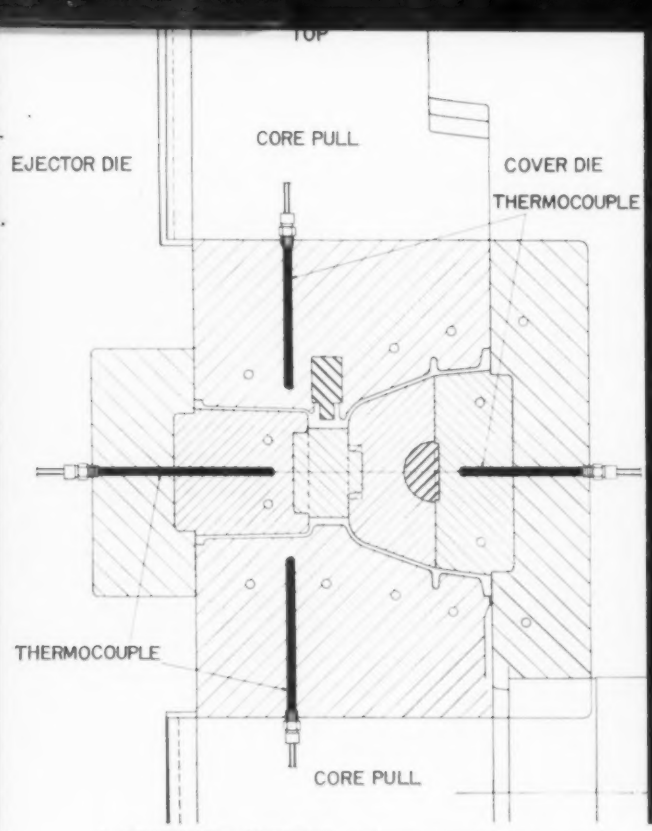
FIVE PLACES WHERE HEAT MUST BE CONTROLLED

1. The alloying room where metals are heated and superheated.
2. The holding furnace. Molten metal is held at accurate temperature for casting.
3. The dies, where heat exchange usually takes place.
4. Injection mechanism. This includes nozzles of machines casting zinc, and plunger and sleeve in machines casting aluminum.
5. Preheating inserts where they are used.

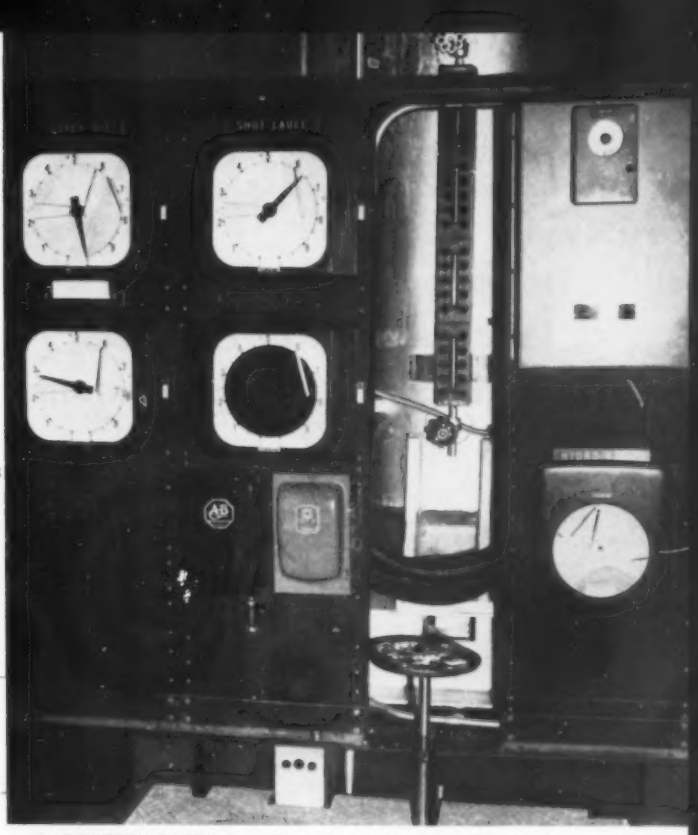
TEMPERATURE CONTROL COLD CHAMBER SLEEVE AND PLUNGER

The temperature of shot sleeve and plunger have a great effect on the quality of aluminum die castings. These parts are not temperature controlled on average size die casting machines. The plunger is always water cooled, but the cold chamber sleeve usu-

*Assistant General Manager, Chief Engineer, The Doehler Jarvis Division, National Lead Company.



2. SCHEMATIC DIAGRAM of thermocouple placement in a die casting die. Control should be at critical points in the die.



3. CONTROL PANEL for a large die casting machine. Shot sleeve, die, hydraulic system and melting equipment are all controlled.

ally has no cooling at all.

It adjusts itself to a temperature which represents an equilibrium between the heat-input from the molten metal and the heat loss by radiation and conduction.

As a result the shot sleeve is usually too cold when small die castings are produced and often overheated when heavy and large castings are made. This overheating of the shot sleeve increases wear and maintenance and is the major cause of breakdowns of the injection system on large die casting machines.

For plunger diameters of more than 4", therefore, water cooled and temperature controlled shot sleeves were introduced to insure proper clearance and operating conditions between plunger and sleeve. Such a water cooled and temperature controlled shot sleeve with a bore diameter of 6" for castings between 40 and 70 pounds aluminum is shown in figure 1.

CONTROL OF NOZZLES

The temperature of the nozzle in zinc die casting machines must be controlled to prevent nozzle overheating or freezing of the zinc. In most cases a small amount of heat must be applied to the nozzle at all times, especially during periods of slow or nonoperation.

A typical approach is to heat the nozzle with one or more gas flames and as the speed of operation of the die is established the operator regulates the gas valves until, by the appearance of the sprue plug, he can tell that it is operating properly.

This method has its disadvantages. There is always the tendency to overheat the nozzle, especially during down time. This makes for short nozzle life and poor casting quality.

A much better approach is to use a nozzle heated with resistance elements integrally cast on the outside or sheathed around it in some manner and controlled by a thermocouple and pyrometer. The best temperature can be determined and held constant with a longer nozzle life and better production as a result.

DIE TEMPERATURE CONTROL

Temperature control within the die itself is not easy to accomplish. It is general practice to control the heat input to the die as accurately as possible by maintaining fixed injection cycles.

The die into which the molten metal is injected first absorbs the superheat while filling, and when it is full and under the high pressure of injection, it also absorbs the heat of solidification. After the casting has frozen, the die is opened and the casting ejected as soon as the metal is strong enough to sustain itself.

The temperature of the casting die during this period is important. If the die is too cold the finish of the casting will be poor and will show run marks, or thin sections will have misruns. If the die is too hot the part may show blisters, the cast metal may solder

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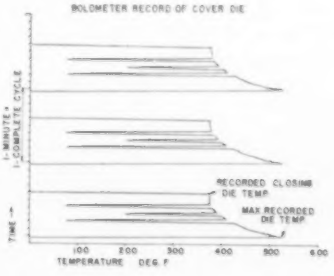

4. BOLOMETER RECORD for three complete cycles during the casting of aluminum.

Introducing A Startling Process Which Promises To Become Very Important

Making Strip Metal From Metallic Powder

TYPICAL PROPERTIES OF POWDER METAL STRIP PRODUCED BY ROLLING VS STANDARD MATERIALS

Material	Strip Thickness in Inches	Tensile Strength psi	Elongation % in 2"
Copper			
Powder	0.0106	40,100	34.0
Standard	0.40	32-40,000	25-45
Nickel			
Powder	0.007	55,800	40
Standard	———	55,000	40
Iron			
Powder	0.007	45,800	12.5-22
Standard	———	49,500	45
Aluminum			
Powder	0.010	16,700	25
Standard	0.062	13,000	35
70-30 Brass			
Powder	0.020	54,000	45
Standard	0.020-0.050	45,000 (min.)	40(min.)
Monel Metal			
Powder	0.005	75,800	28.8
Standard	———	70-85,000	30-50
18-8 Stainless			
Powder	———	108,000	33
Standard	———	80-90,000	55-60

BY: WILLIAM N. HAYDEN*
JOHN D. SHAW**
WALTER V. KNOPP**

Editor's note: The following article is a condensation of a paper presented at the Metal Powder Association — American Society for Metals Symposium, November 7, 1957.

THE first suggestion that a solid strip could be made directly from metal powders came about 1900. In the 1930's at least two patents were issued on processes that contemplated rolling strip from sintered compacts. Continuous rolling of powders started about 1942 in Germany, but it was not till after World War II that publicity was given to this process.

The production of low cost metal powders by hydro-metallurgical methods heightened interest in the direct production of strip from powders. Using the Chimco technique for powder production and the German techniques as basic methods, Hayden Metals, Inc., set up a research and pilot operation in Salem, Ohio, to develop economical and practical methods of strip production.

This operation by Hayden is in co-operation with the Fluor Corp., Whitaker Metals Corp., and E. W. Bliss Co. Other companies directly interested are: Chemetals Corp.; Sherritt-Gordon Mines, Ltd.; Sylvania Electric Products, Inc.; and some of the major ferrous and non-ferrous powder producers in the United States.

*HAYDEN METALS, INC.
**S-K-C RESEARCH ASSOCIATES

In the present pilot plant, powder is fed to a rolling mill where it is compacted to less than full density, but into strip strong enough to be handled. From the mill, it may be rolled into coils for batch annealing, or may be fed directly onto the belt of a continuous sintering furnace. The operations which follow sintering, such as annealing, and cold or hot re-rolling, etc., adhere to standard practices.

The thickness of the strip formed from powders varies with roll diameter, roll gap, and the properties of the powder. Other factors, influencing strip thickness are: softness of the powder; roll speed; particle size; additions of lubricant; and the roll surface finish.

While powders may be rolled to full density before sintering, it is usually undesireable since expansion on sintering may cause internal flaws. Stresses may be set up that will cause fracture and minute amounts of entrapped air might cause rupture. Ideally the density of the green strip should be such that no expansion or shrinkage will occur during sintering.

In the work done thus far on copper powder, hot rolling is practiced since this has shown the greatest economies in fabricating.

The present pilot plant has a capacity of four tons per day. Present plans call for the first production unit to have a capacity of 50 tons per day. This will tie such a rolling plant into a powder producing plant using the Chemetals process at peak efficiency for the powder production.

Let **DOLLIN** Engineers

Get the most out of your Die-Casting Designs

—at the lowest possible cost!

LARGE CASTINGS

Aluminum castings made on large cold chamber type high-pressure machines. Large zinc castings made on large plunger type machines.

SMALL ZINC CASTINGS

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Send blueprints, specs or samples of your parts to Dollin for study and quotation, without obligation.

Based on more than 25 years' experience with thousands of die-cast parts and problems, most likely suggestions can be made that will cut piece costs—include fastening elements—reduce machining and assembly operations—increase strength—or improve appearance.

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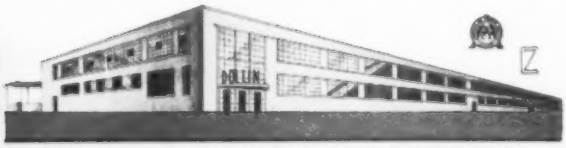

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OXYGEN REGULATOR is a collection of assembled die castings with the single exception of the inlet seen at left. Because of the fact that die castings make up most of its structural parts, it is less costly.

DIE CASTINGS

Exacting demands of military and commercial specifications dictate . . .

Four Good Reasons Why Die

DIE casting was the only way to combine a lightweight material, integral lettering, easy gasketing, less machining, and low final cost. That's why engineers at Alar Products, Inc. choose to use die castings in the A14 Pressure breathing, diluter demand type oxygen regulator.

It provides flyers with the correct mixture of oxygen and air, automatically at any altitude, from sea level to 33,000 feet, and pure oxygen to 45,000 feet. This precision instrument, which meets exacting military and commercial aircraft requirements, is made with die castings because:

1. INTEGRAL LETTERING

The selector dial is a combination of two aluminum die castings. If the part were to be manufactured by other means, several extra assembly operations would be required. But, more important, die casting avoided the possibility of rejects.

The operating directions, see Figure 1, are cast into the dial. If stamped, some parts would be rejected and an extra handling operation would be needed. This demonstrates the advantage of buying a die casting; a complete part.

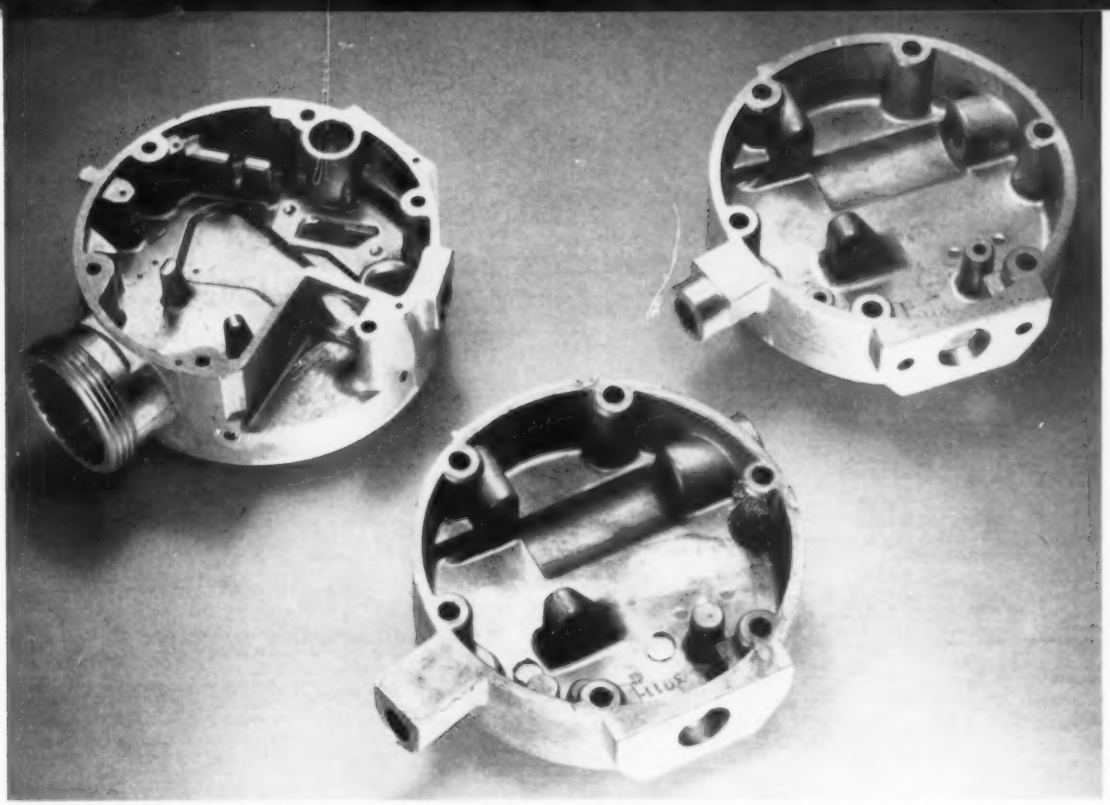
2. EASY GASKETING

The castings used in the pressure reduction stage and second stage, where oxygen is mixed with air, are assembled one on top of the other. Operation of the regulator depends on the fact that the joint between the castings is air tight when assembled. The two die cast stages have such smooth surface and exact tolerances that only a single rubber gasket is necessary to seal them. This precision, found in die casting, eliminated a machining operation to provide these close tolerances.

3. LESS MACHINING

The regulator, with its many die castings, shows the exacting tolerances and finishes obtainable with the die casting process. Necessary machining is shown in Figure 3, which shows the two stages in the as-cast and as-machined stage.

Fourteen drilling and tapping

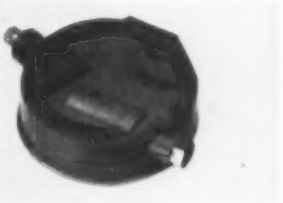


PAIR OF BODY CASTINGS at left are seen in the as-cast stage. This illustrates in detail, the differences in castings as they come from the die, and the few changes needed. Lower casting is seen finished, at right.

Castings Pay For Themselves

1. LETTERING is cast in part.

2. GASKETING is easier.



3. FINISHING is reduced.

4. SPLINE fitting cuts costs.

operations are necessary to prepare the second stage for final assembly and painting operations.

The spline fitting, on the oxygen-air mixing stage, is in example of a cast part that would be costly to duplicate by other means. The only finishing operations necessary are the application of a conversion coating and final painting. This finishing operation is standard on the complete unit.

4. LOW FINAL COST

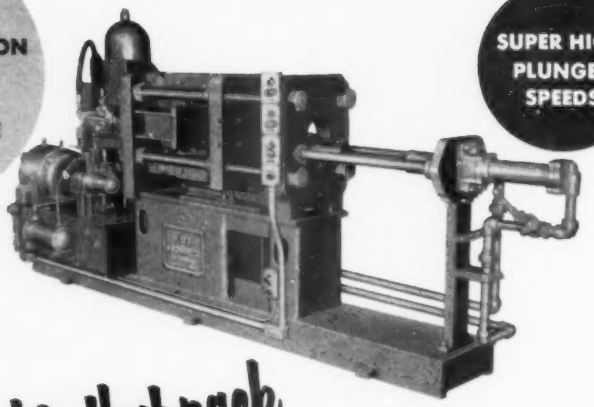
The low final cost of the regulator is lowered further by the use of other die castings. The diluter lever, used in the diluting of oxygen with air, on the pressure reduction stage; the screen frame for the air intake; and the mounting bracket, are typical examples of the mass production of trend especially designed, quality parts at the lowest possible cost.

Early models had a die cast fulcrum on the pressure reduction stage, Figure 2. This aluminum alloy casting corroded with time. The part is now investment cast in a copper base alloy.

The company drills and reams three holes to maintain total tolerances, two more being cored in the casting. The fulcrum pin is guided by a single hole.

Built to military specifications and supplied primarily to the military services, the A14 regulator operates on inlet pressures from 50 psi to 500 psi, and temperatures as low as —65°F. Inlet pressures up to 2000 psi can be accommodated with special units.

TWO SIZES 100-TON & 200-TON STRAIN GAUGE TESTED LOCKING FORCE



SUPER HIGH PLUNGER SPEEDS

SUPER HIGH INJECTION PRESSURES

BUILT 2 WAYS— PLUNGER GOOSENECK OR COLD CHAMBER INJECTION

Middleweights that pack the power of heavyweights!

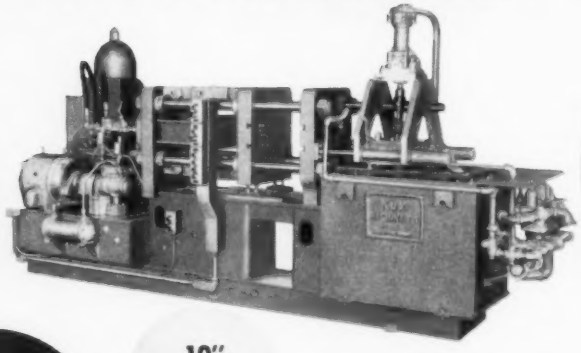
KUX

sensational new

DIE CASTING MACHINES

SOLID STEEL DIE PLATES UP TO 24" x 24" 5" THICK

MAXIMUM OPERATING SPEED WITH OVER 1000 FREE CYCLES PER HOUR



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SELF CONTAINED HYDRAULIC SYSTEM WITH OVERSIZED ACCUMULATOR BOTTLE, HEAT EXCHANGER AND PUMP FILTERS

ELECTRIC PUSH BUTTON CONTROLS WITH AUTOMATIC TIMING

10" OPENING STROKE

Models HP-12 and BH-12 have 100 tons die locking pressure and 12¼" x 15¼" clearance between bars.

Models HP-15 and BH-15 have 200 tons die locking pressure and 15¼" x 15¼" clearance between bars.

KUX MACHINE COMPANY

6725 North Ridge Avenue, Chicago 26, Ill.

Builders of a full range of die casting machines . . . from 25 tons to 1000 tons in size.

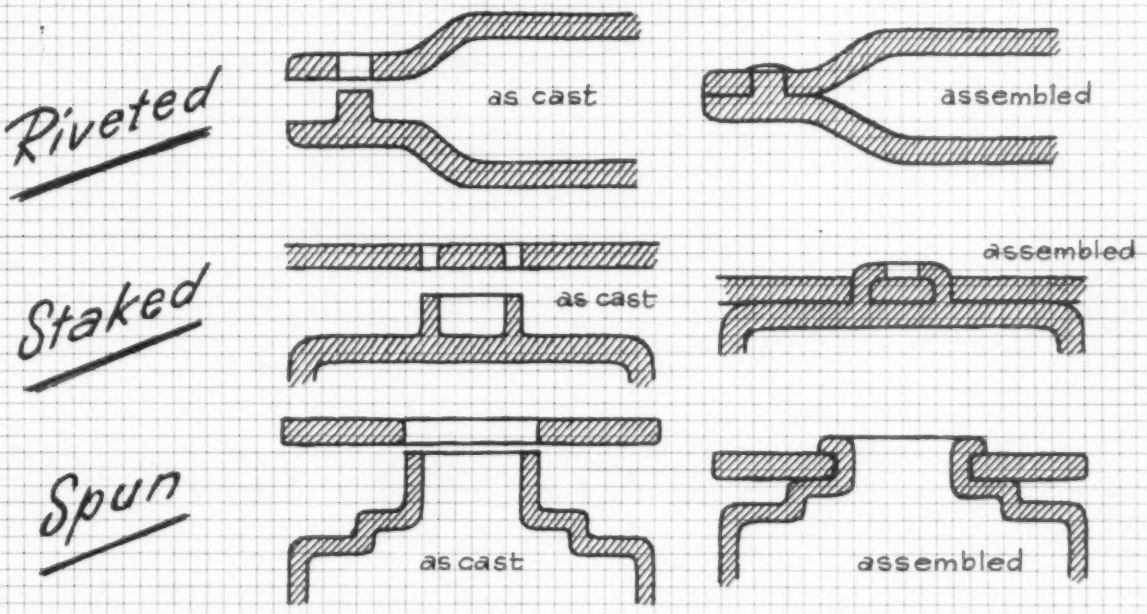
To get the complete story now on these two new hydraulically operated Kux die casting machines, write for catalog today.

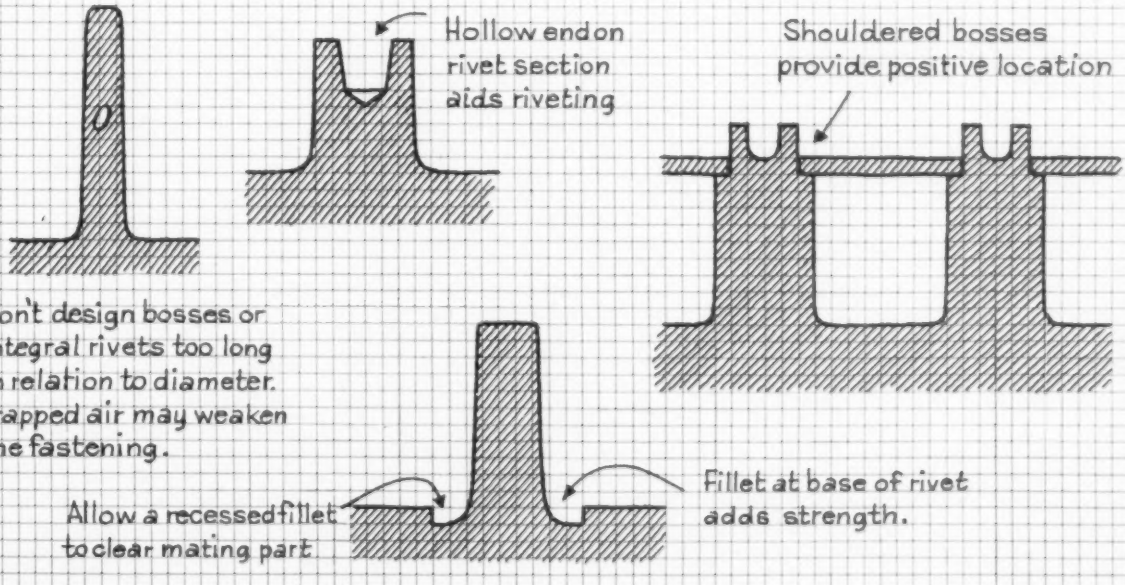
For more information circle No. 78 on the Reader Service Card

Zinc Die Castings can be designed for self-assembly

use these **Design Tips** for lower costs -better products

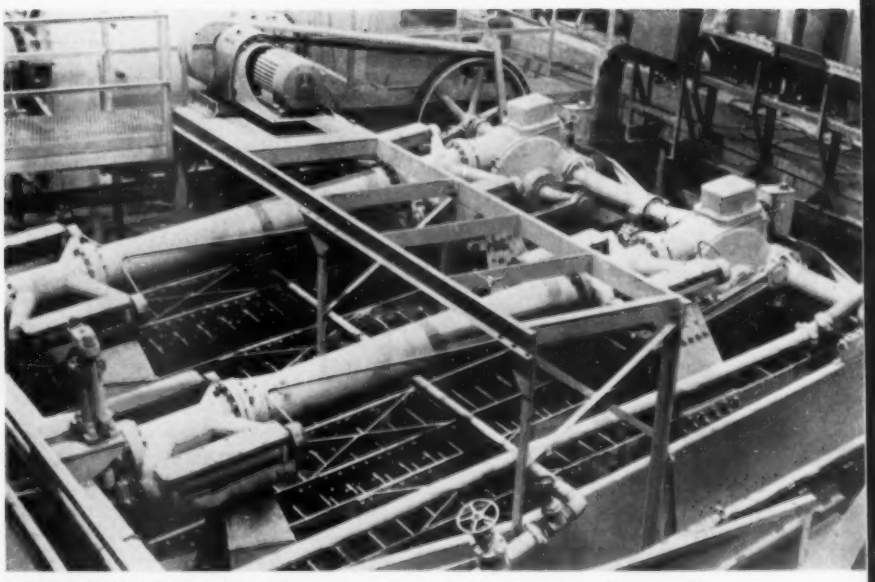
Zinc alloy die castings can be riveted, spun, or staked to make a cheap, secure, permanent assembly.




Hollow end on rivet section aids riveting
Shouldered bosses provide positive location
Don't design bosses or integral rivets too long in relation to diameter. Trapped air may weaken the fastening.
Allow a recessed fillet to clear mating part
Fillet at base of rivet adds strength.

The old way
is harder and
more expensive . . .

The new way
is easier and
economical, proving . . .



MORE EFFICIENT assembly at lower cost was secured when the rake assembly on this classifier was redesigned. A three piece assembly which required expensive machining, welding and bolting was replaced by a single casting.

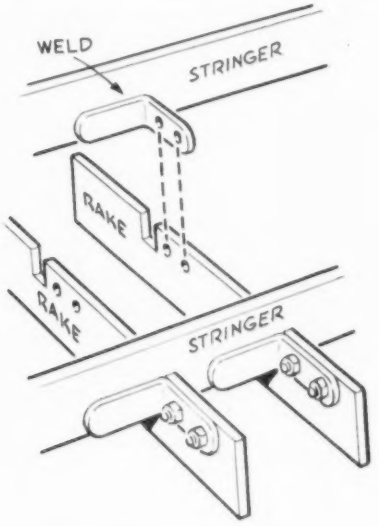
When Designers and Foundrymen

COOPERATION between design engineers and experienced foundrymen let Dorr-Oliver reduce a complicated five-step assembly to a simple two-step operation, drilling bolt holes in stringers and fastening blades in place. The redesign resulted in an appreciable cost saving.

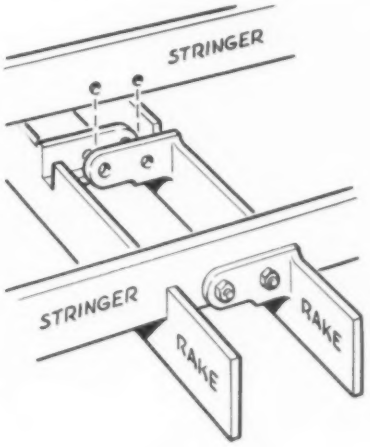
When the company set out to improve rake design on their Type H Rake Classifier, manufacturing and assembly methods were examined. The hoe-like blades were simple, flat, cast plates of type 316 stainless steel. Milled slots and accurately drilled holes were required for assembly. First in the re-examination of the design was a warping problem which frequently appeared when brackets, used to support the rakes, were welded to stringers. This problem was solved by Dorr-Oliver engineers in cooperation with the foundry engineers at Cooper Alloy Corp. The foundry was able, through the use of resin-bonded shell cores, to provide castings which met design requirements and eliminated both a milling and a drilling operation.

The function of the Type H gravity classifier is to classify into two fractions the solids in a liquids-solids suspension. Liquid containing the more finely divided solids overflows the lower end of the classifier's inclined tank while the larger particles which settle to the bottom of the tank are continuously raked up the incline and discharged over the higher end. Two metal bars called stringers run the length of the tank and are fastened to a power-driven rocker head. Rake blades fastened to the stringers are guided by the rocker head's oval motion and move settled material up the inclined slope of the tank. Alignment of the rakes with the tank bottom is necessary to prevent scraping or excess clearance between blade and tank.

The rake blade previously used was flat. To fasten it to the two stringers required a pair of bracket pieces called "clip angles". There were five steps involved in the assembly. Just the elimination of warpage due to welding would be a material gain even if



WELDED JOINTS frequently caused warpage of the angle supports for rakes. The rakes required a milling and drilling operation and fit was often difficult.



A SINGLE CAST unit now replaces the three parts formerly used. The only machining operation is drilling the stringer. The result—lower costs.

Work Together, Costs Go Down!

all of the other operations remained. The assembly under the old order was:

1. Two holes were drilled in one leg of each clip-angle to accept the bolts holding the rake blades.
2. The blank leg of the clip-angle was welded to the stringer.
3. Holes, corresponding to those drilled in the clip-angles, were drilled in the rake blade.
4. Two slots were milled into each rake blade to accommodate stringers.
5. When the rake blades were in place, assembly was completed by bolting blade to clip-angles.

In the redesigned rakes, the supporting clips could be cast integrally with the blades; provided the bolt holes were accurately positioned. The inner surfaces had to be smooth enough for accurate alignment.

The designers placed the cast-on brackets so that two identical rake blades could be bolted to the stringers with the same set of bolts by rotating the rakes at assembly. One blade has the flanges facing left, the other has flanges facing right. Thus the installation of blades would require only drilling the proper holes in the stringer and bolting on the complete blades.

The redesign contemplated rough slots and bolt holes cast into the rake blades. Both slots and holes were to be machined to size as second operations. After studying the piece, foundry engineers suggested the use of precise plastic shell cores. Holes and slots could meet finished tolerances without any machining.

The final casting requirements were:

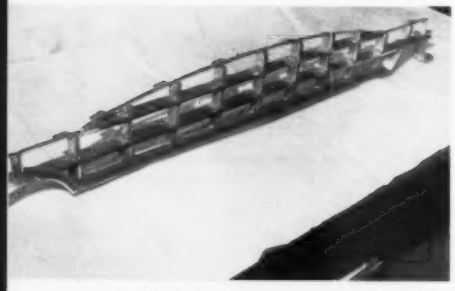
1. The rake blade castings were to be made of type 316 stainless steel.
2. The inside face of each flange (where it abutted the stringer) required a smooth finish — A.S.A. Standard 250.

Continued on page 115

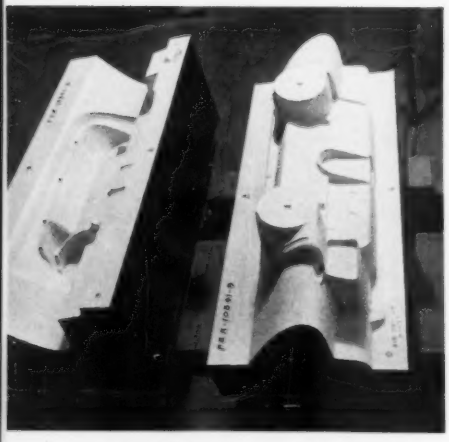
The complicated task of getting various die development phases to co-ordinate has produced...

Prototypes that Show

GAGES used for checking tolerances and precision accuracy of die castings as they are developed for use in a wide variety of industrial fields including the automotive.



PROTOTYPE die castings seen above represent a finished assembly recently developed at Erler. It is composed of as many as six zinc die castings ready for plating.



PLASTIC cover together with ejector-duplicating models. This interesting pair have been developed for the automotive industries. They are destined for use in making an instrument panel cluster.

TRADITIONALLY, pattern and model shops have served die casting producers by preparing models and patterns for a variety of uses. Many times these jobs have been contracted with little co-ordination between the various phases of the die casters' tooling problems. Indeed, original master models might be produced by one shop, duplicating models by a second, checking fixtures by a third, contour blocks by yet another.

With this established trend toward more complex shapes, heavier price competition, and demands for faster delivery and higher quality, a new concept of Pattern Shop Services has been developed. The Erler Pattern and Model Corporation of Toledo has pioneered the application of these expanded services and has found a new relationship between model builder, die caster and customer. Although the automotive industry has shown the greatest need for this new concept, all manufacturing companies are experiencing the same increase in complexity, providing a ready market for the services of alert model builders.

Three-dimensional models, or partial models have been in use by die casters since duplicating machine tools have been available. Difficult contours have generally been developed in steel by duplicating the shape of a part from a hard plaster cast of a wood pattern.

As parts have become more complex, not only has the pattern and plaster method been improved but many other functions; such as determination of parting lines, trimming, die design and checking are made available as a new service. The model maker, if sufficiently versatile, is in a position to produce not only the master model but the duplicating models complete — cover, ejector and slides. This is then followed through with checking fixtures, drilling fixtures and trimming pads. Accuracy in every step and economy of multiple operations can be assured by making one supplier responsible for all phases of production.

The extreme of this versatility is offered in adding prototype model production. This consists of producing complete prototype castings, or assemblies where required, to allow the final customer to check for functional operation and appearance before production tools are finished. The production of temporary molds, the contracting for castings, machining, finishing and plating, and the assembly of parts are all arranged by the model maker, who is in the best position to check dimensions and contours at this stage. Where plastic pieces must be made, it has even been found feasible to maintain plastic molding presses.

The first step in the cycle is still the production of an accurate die model. This can be built from part print, photo reproduction drafts, templates or any combin- of these things. Where there are mating surfaces with other parts, contour blocks are furnished to which the model must conform. This is true in automotive production, where die castings fit against fenders, doors, hoods and various interior panels, and also in the home appliance field. Under ideal conditions, this master model is built to include the die casting shrinkage. The tolerances involved indicate that the model maker must work with the same precision gaging equipment used by the die maker. These master models can be built to a tolerance of plus or minus .005". Wood is the traditional material, but brass and aluminum are sometimes used.

When the master model has been approved for dimension, ap-

Casting Design Flaws

pearance and castability, duplicating models can be started. Hard, non-shrinking plasters or epoxy resins are used, the epoxy resins having more durability while exhibiting the same dimensional stability as the plasters. The epoxy veneer-on-plaster method developed by Erler has proved to be an extremely durable and stable method for construction of the die cavity models.

The model maker who is schooled in the production problems of the die caster can visualize and eliminate many future problems as he builds up parting lines around the model. The three-dimensional character of the work gives a more complete view than that of a complete, but flat, drawing of a part or die. Metal flow, gating, trimming die design, finishing, plating and assembly problems all can be studied at this point. The savings to die caster and customer can be substantial through the early determination of parting lines, draw angle, wall stock, unforeseen undercuts, heavy die-wear areas and bad trimming conditions.

When a model has been built, for engineering purposes, without shrinkage, the model builder can incorporate shrink into the duplicating model by a variety of methods. Wall stock can b determined within plus or minus .005″ in furnishing both cover and ejector models. This relieves the die maker of stylus adjustments to allow for wall stock. One obvious advantage in building both cover and ejector models is that both halves of the die may be duplicated simultaneously. The slower method requires use of the completed cover-half as a master for the ejector-half duplication. Still another advantage is the assurance that the shut-off areas of the die face will match no matter how irregular the partings are because these faces on the models are cast one from the other.

MASTER DIE MODEL and plaster duplicating-models seen above are being used in manufacturing the automotive torque-converter housing.

Checking fixtures for production inspection and quality control use should be produced with dimensional reference to the master model. Where odd contours are to be checked, the model shop can produce a set of economical pages of glass reinforced plastic. Bushings and wear plates are cast in position; plug gages and template accessories are attached to the base of the gage. While this step requires the services of an experienced gage designer, the market for this service justifies his full-time employment on the job.

The use of cast epoxy resins permits the model shop to produce such production items as trim nests, stud driving fixtures, contour blocks together with buffing fixtures.

The normal services expected from a pattern and model shop now include:

Master models.
Prototype parts, assemblies.
Duplicating models for dies.
Duplicating models for trimming dies.
Contour blocks.
Checking fixtures and gages
Production tools.
Die patterns.

The pattern or model shop has emerged from the small, specialized hand-craft shop to a position of great importance in the cycle from design board to product sale. At every phase up to the final product, the model maker can offer a service calculated to simplify the problem of producing parts that fit.

DATA OFFERED IN THIS MONTH'S ADS

the Reader Service Cards on the facing page will get you these free reference materials. Circle the numbers and mail.

2. Die Casting Machines—Bulletin P-10 from ABC Die Casting Machine Co., provides complete engineering data and prices on the company's line of small die casting machines.

3. Casting Supplies—Detailed information is available on Refrax Pots that retain heat; have less swelling and distortion; are tough, durable; and triple inspected. ACF Industries.

4. Dispersions — of colloidal graphite and other dispersed solids are listed in the latest Products List from Acheson Colloids Co. In quick-reading chart from, the list provides a resume of dispersions and their applications.

6. Die Casting Furnaces—Information is available on the Ajax Engineering Company's Duplex Ajaxomatics. For a complete casting cycle the operator only has to push a button. At the completion of the cycle the operator removes the finished casting.

7. Die Steel—Data on Potomac M Hot-Work Die Steel is furnished in a concise four-page folder, from Allegheny Ludlum Steel Co. The folder includes certified laboratory information on physical characteristics.

8. Dies & Related Tooling—A complete list of the facilities at Alliance Special Products is available with other information on dies and related tooling.

14. Die Casting Machines—Catalog from American Die Casting Machinery Co., shows their complete line of die casting machines for zinc, tin and lead.

15. Zinc Alloys—Complete data on zinc-base alloys is available from the Metal Sales Dept. of The American Metal Co., Ltd.

20. Investment Casting—Information on the "Supercast" process of investment casting, that makes it possible for Arwood Precision Casting Corp. to guarantee mechanical properties above "Aircraft Quality", is available.

21. Fluxes—for all metal melting industries are presented in technical literature from Atlantic Chemicals & Metals Co.

25. Die Casting Machines—A complete catalog is available from B & T Machinery on their line of cold chamber and gooseneck type die casting machines which are designed and built to customer specifications.

28. Automatic Die Casting Machine—for small parts diecasting, features a 60 ton lock and has a 1 lb. capacity. Information on this machine, that requires no operator and reaches production averages up to 1500 shots per hour, is available from DCMT Sales Corp., Div of British Industries Corp.

30. Hydraulic Trimpress—Information is available on a fast hydraulic trimpress that has 76 cavity openings, 28 platen sizes and 12" stroke. Bausenbac Hydraulics Div., Buffalo Metal Container Corp.

31. Custom Alloys—An engineering handbook for metallurgists offered by Cannon-Muskegon Corp. gives complete data on their "UltraMet" and "Master-Met" alloy Service.

33. Automation In Die Casting—A brochure from Cast-Master Inc., describes a multiple cavity loader-unloader that loads laminations, die casts, trims, and unloads 4 rotors automatically.

34. Fire-Resistant—Celanese Cellulubes are described in a new technical bulletin from Celanese Corp. of America. No pressure surges, no evidence of fire and excellent lubrication are the three main features.

35. Design Pointers—for Die Castings is the title of a helpful booklet offered by The Chicago White Metal Casting Co., Inc.

37. 800 Ton—die casting machine. Specifications and technical data is available on the new 800 ton hydraulic die casting machine from Cleveland Automatic Machine Co. The machine will produce castings up to 20 lbs. aluminum; 46 lbs. zinc.

40. Die Casting Complicated Shapes—with Tadanac Zinc; an alloy ideal for low temperature high speed operation, is discussed in literature from Consolidated Mining & Smelting Co. of Can., Ltd.

41. Die Cavity Sets—A 12-page brochure from the Detroit Mold Engineering Co. gives complete prices and specifications on six standard sizes of cavity sets for die casting.

42. Special Castings—The facilities of the Crucible Steel Co. of America, Special Cast Products Div., for producing specialized tool steel castings by the investment and other processes is presented in an informative booklet.

44. Thread Guard—Literature describes Thred-Gard, a high temperature anti-seize compound. The compound eliminates seizing and galling of threaded connections and screwed fittings to temperatures of 1200° F. Crane Packing Co.

46. Water-Cooled—sprue bushings and spreaders are described with complete specifications in a data sheet from Detroit Mold Engineering Co.

47. Thermometers—Precision thermometers featuring direct-drive bi-metal coils which eliminate gears and linkage, are presented with complete engineering data in Bulletin No. 5 from W. C. Dillion & Co., Inc.

52. Furnaces—Bulletin C, from Eclipse Fuel Engineering Co., illustrates and describes 9 crucible and double chamber dry-hearth furnaces custom-designed for most melting operations.

54. Die Profiler—Price List DV-18 from Engis Equipment Co., describes the Di-Profiler, a flexible shaft reciprocating tool for grinding, filing, scraping, honing, lapping and polishing.

57. Trimming Press—Federal Press Co. introduces its new Federal 55 Press, which features oversize dimensions to handle bulky jobs, in a catalog which gives specifications on the company's complete line.

58. Specialty Lubricants—Bulletins describing Fiske's 231 Die Casting Compound and other speciality lubricant are available from the Fiske Brothers Refining Co.

62. Four Technical Bulletins—are available from Gries Reproducer Corp. Engineering data and illustrations present the company's complete line of products and services.

64. Furnace Refractories—Complete technical data on refractory materials for repairing and lining melting furnaces is offered by Harbison-Walker Refractories Co.

Continued on page 124

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- ☐ Plaster Mold Castings
- ☐ Shell Mold Castings
- ☐ None of these

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7	24	41	58	75	92	109	126	143	160	177	194	211	228	245	262	279	296
8	25	42	59	76	93	110	127	144	161	178	195	212	229	246	263	280	297
9	26	43	60	77	94	111	128	145	162	179	196	213	230	247	264	281	298
10	27	44	61	78	95	112	129	146	163	180	197	214	231	248	265	282	299
11	28	45	62	79	96	113	130	147	164	181	198	215	232	249	266	283	300
12	29	46	63	80	97	114	131	148	165	182	199	216	233	250	267	284	301
13	30	47	64	81	98	115	132	149	166	183	200	217	234	251	268	285	302
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15	32	49	66	83	100	117	134	151	168	185	202	219	236	253	270	287	304
16	33	50	67	84	101	118	135	152	169	186	203	220	237	254	271	288	305
17	34	51	68	85	102	119	136	153	170	187	204	221	238	255	272	289	306

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4	21	38	55	72	89	106	123	140	157	174	191	208	225	242	259	276	293
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6	23	40	57	74	91	108	125	142	159	176	193	210	227	244	261	278	295
7	24	41	58	75	92	109	126	143	160	177	194	211	228	245	262	279	296
8	25	42	59	76	93	110	127	144	161	178	195	212	229	246	263	280	297
9	26	43	60	77	94	111	128	145	162	179	196	213	230	247	264	281	298
10	27	44	61	78	95	112	129	146	163	180	197	214	231	248	265	282	299
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12	29	46	63	80	97	114	131	148	165	182	199	216	233	250	267	284	301
13	30	47	64	81	98	115	132	149	166	183	200	217	234	251	268	285	302
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15	32	49	66	83	100	117	134	151	168	185	202	219	236	253	270	287	304
16	33	50	67	84	101	118	135	152	169	186	203	220	237	254	271	288	305
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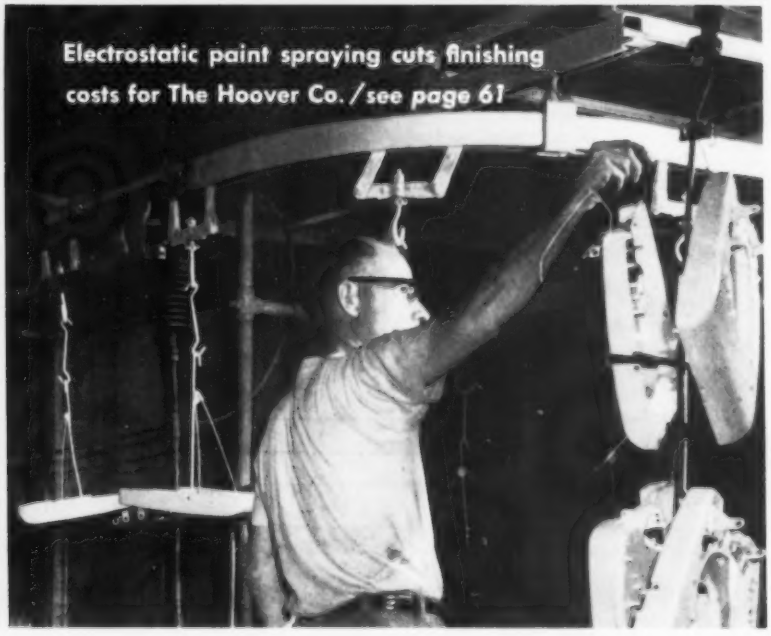
PMM

Finishing Section

The specialized finishing methods, equipment and materials used to machine, assemble, surface condition or surface coat precision metal molded parts are presented here. This includes all secondary operations which convert a raw casting to a finished product.



Electrostatic paint spraying cuts finishing costs for The Hoover Co. / *see page 61*

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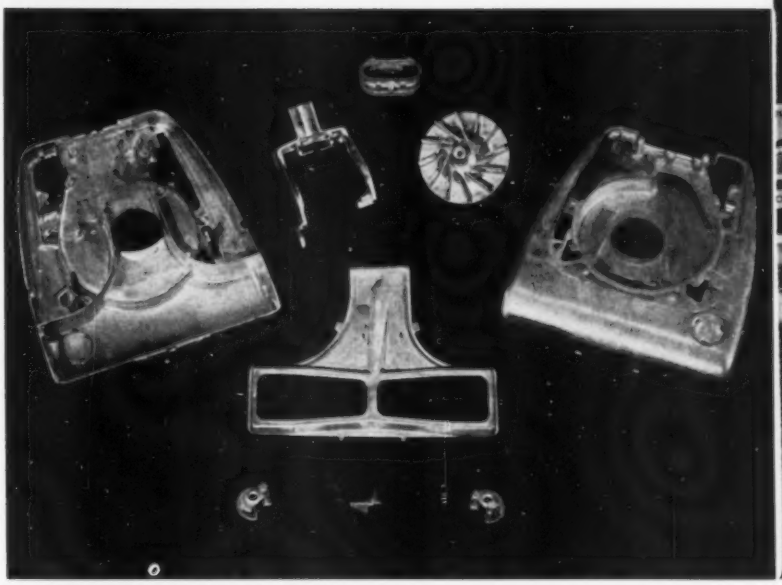


1. REPRESENTATIVE DIE CASTINGS that go into a domestic vacuum cleaner. Functional correctness must be combined with a superior as-cast surface finish.

2. A MODEL 65 Hoover vacuum cleaner which uses the aluminum die castings shown left.

Finishing Consumer Goods

ON consumer goods the finish must be good. There are many methods that may be used to fabricate a part for correct functioning. But when proper functioning must be combined with a finish that is acceptable to the buying public, then very often die castings are the only answer.

On the model 65 vacuum cleaner made by the Hoover Company, this combination of function, finish and economy has been answered by the use of a number of aluminum die castings.

Finishing of die castings is not limited to securing a pleasing surface. It must include all machining operations that must be done after the casting has been rough-trimmed. Often a good designer can limit these operations to the least expensive ones such as: drilling, tapping, reaming, facing, and a few others. Milling is always avoided when possible, since it is about the most expensive operation performed in a machine shop. Broaching is also costly, as are some grinding operations.

The group of castings shown in figure 1 can all be finished economically. Each part was studied, first from a functional point of view, and then to determine how many machining operations could be avoided either by a slightly more complex casting die, or by modification of the design so that the part as-cast would be adequate.

A further study of the parts, at the design stage, must be made to determine how surface finishing operations will be done. An original design may require hand polishing and buffing, while a modification, possibly a very slight one, will allow the use of fully automatic polishing and buffing equipment.

Now, once parts have been designed for the most economical method of manufacture and the most economical finishing procedures, the types of equipment on which the necessary operations will be done must be considered.

The mass production of consumer goods items, such as the vacuum cleaner being considered as an example, must have every possible operation done automatically. Hand labor is just too expensive. For example, where holes in the casting are to be drilled and tapped it may be that a relatively standard machine such as the Kingsbury shown in figure 3, where all of the holes in the handle bail are drilled and tapped in a single operation, can be used.

One operator to load and unload the machine is all that is required, and this operator need not be highly skilled. In other cases it may be best to build up a special machine using standard components that operate in timed

Continued on next page

See six phases of Hoover's finishing line.

sequence. The decision can only be made for each part and will depend partly upon availability of machines and components, on company policy and on design life.

By the time the castings have been fully machined they have taken on a coating of oil, chips, dirt and other soil. They must be cleaned. The type of cleaning and washing equipment used will depend upon the material from which the part is made and the finish that will be applied later. When paint is to be applied, it is possible, and may be desirable, to use a cleaner that will etch the metal surface slightly. This is particularly true when no conversion coating is used. The etched surface will provide a better tooth for paint than a smooth one.

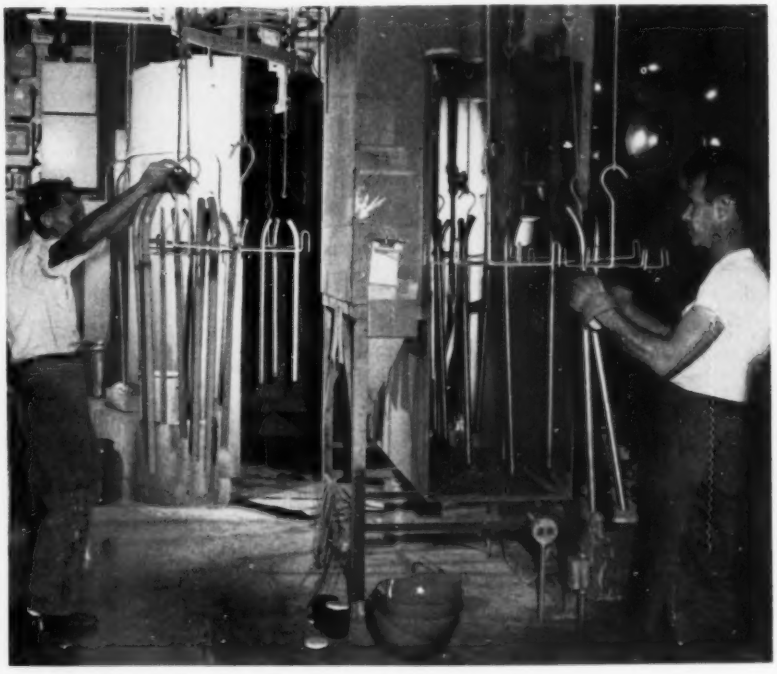
A further complication in most manufacturing plants is that a wide variety of different metals must be cleaned. If one were to choose the "best" cleaner for each case, a plurality of washing lines would be installed. Economically this cannot be done and the usual method is to choose washing and cleaning equipment and materials that will give an adequate and clean surface in all cases. In the washer shown in figure 4, parts of many types can be treated. No etching of the surfaces will take place and any metal part that is used on a vacuum cleaner can be processed.

Following washing and drying the polished aluminum parts that will receive no further surface finishing go directly to assembly. The other parts are routed to the painting department. Automatic painting is used exclusively; formerly the handles were dip coated, but that process was expensive and not completely satisfactory. When hand operated spray guns were used, six or more spray booths were required to maintain production.

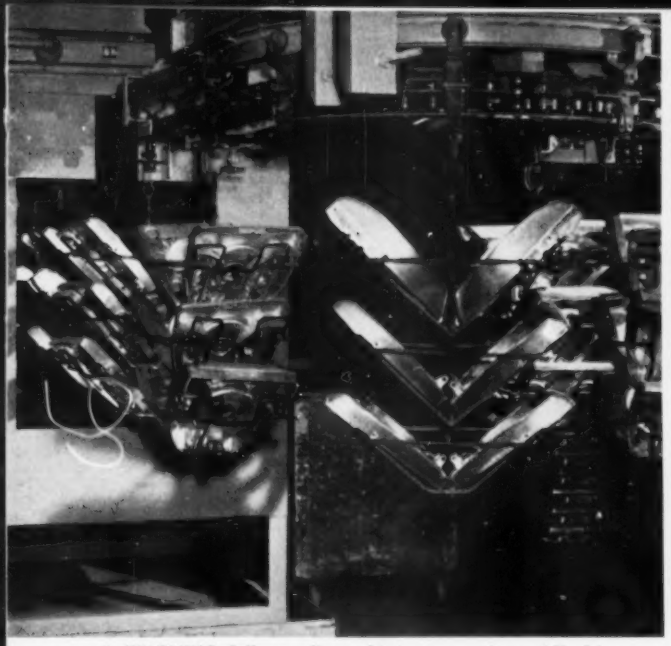
The older spray system has now been replaced by a Ransburg electrostatic unit. This change in equipment has permitted all paint spraying to be done in a single booth. Paint consumption is now reduced by about one-half due to an almost complete absence of over-spray, and the paint film thickness is far more uniform. A further advantage is that highly skilled labor is no longer required. Usually only one man per shift is required for attendance at the spray booth.

In the spray system used, the rotating disc which discharges the paint oscillates in a vertical direction. The amplitude of the oscillation can be set from zero to about four feet so that even very long parts such as the cleaner handles can be coated. As the parts pass in front of the spray gun they rotate and this movement, combined with the vertical motion of the discharge disc,

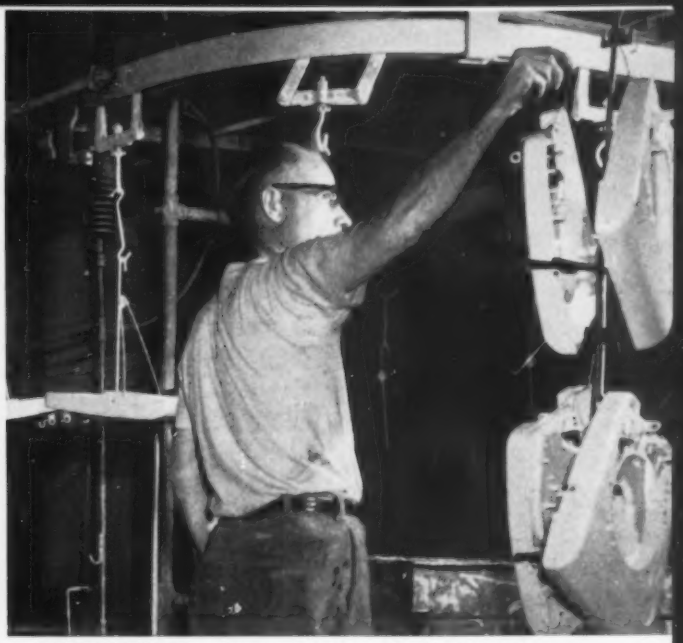
3. MINIMAL MACHINING is required when die cast parts are used. Here handle bails are machined on a Kingsbury machine.



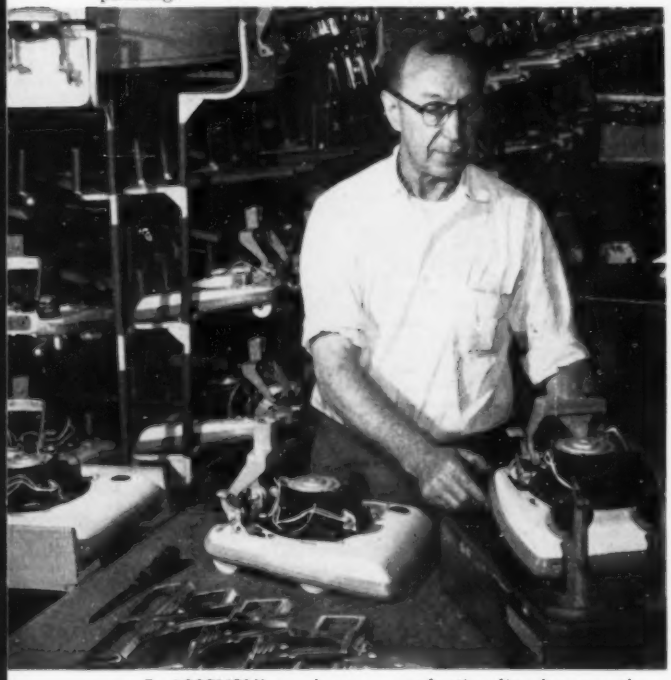
6. RECIPROCATING spray disc allows painting of parts up to about 4 ft. long. With proper racking these handles are uniformily painted.



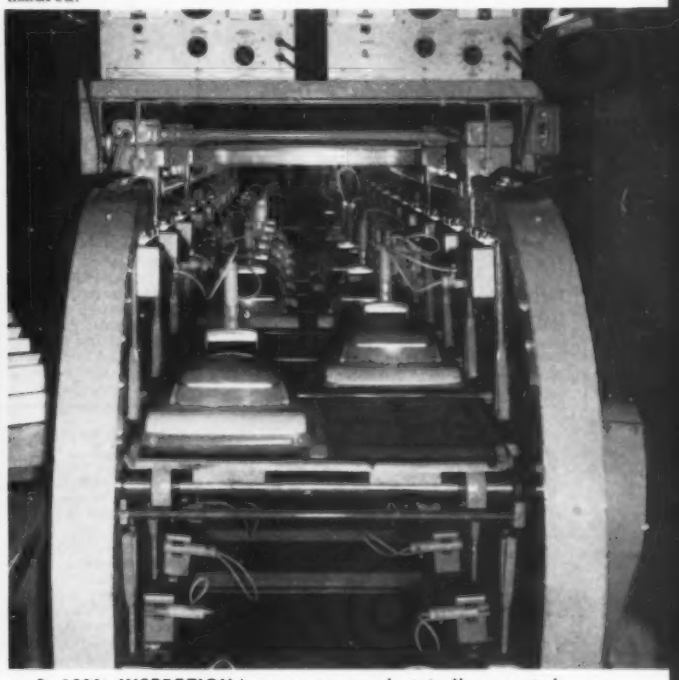
4. WASHING follows all machining operations. All chips and soil must be removed and the surface prepared for painting.



5. ELECTROSTATIC paint spraying is used with the parts on a mono-rail conveyor. Complete, uniform coverage is assured.



7. ASSEMBLY can be on a production line because the die cast parts are so accurate that complete interchangeability is assured.



8. 100% INSPECTION is necessary on electrically operated appliances. Here the cleaners are automatically inspected for motor operation and grounds.

insures complete and uniform paint coverage.

After painting, all parts pass through a baking oven where the paint is dried and cured. The drying oven is in two stages. The first stage for solvent evaporation and pre-drying and the second stage for final drying and curing. Convection heating is used for the solvent evaporation stage and radiant heating for curing.

The final stages are, of course, assembly and testing. Parts and sub-assemblies are fed to the final assembly line. A portion of the assembly is shown in figure 7.

Inspection of consumer goods can be highly critical and expensive. Where any electrically operated device is used there may be no ground. Any failure which could result in the user "getting a shock" cannot be tolerated.

Also, the motor has to run. Inspection of vacuum cleaners is then 100% for grounds and motor operation and at a lesser level for other inspectable points such as air flow, appearance, etc. Where less than 100% inspection prevails, statistical sampling methods are used.

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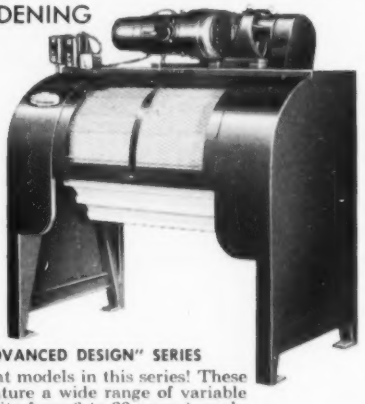

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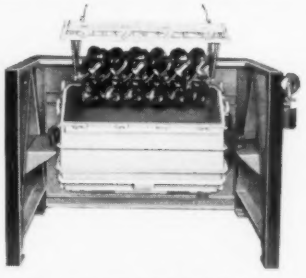
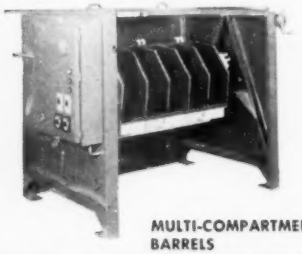
Thirteen great models in this series! These machines feature a wide range of variable speeds (infinite from 6 to 30 r.p.m.), making possible economical deburring and finishing of the greatest variety of parts. Each unit has Almco's exclusive design features and rugged construction to stand up under all types of punishing applications.



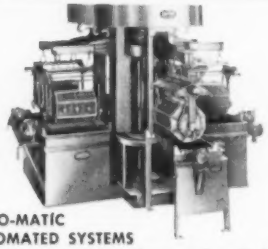
"FIXTURE" TYPE BARRELS

Pioneered by Almco for processing large and intricate parts. Custom designed fixtures hold parts securely, prevent part-on-part impingement and allow abrasive action to reach all surfaces, cavities, slots, etc. Barrels have automatic forward and reverse controls. Almco also offers integrated materials handling systems for further barrel finishing economies.



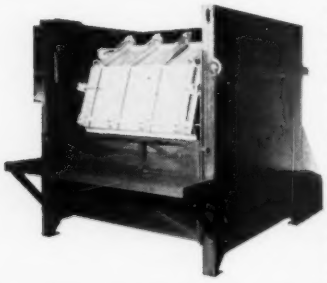
MULTI-COMPARTMENT BARRELS

Do you have these deburring and finishing problems — wide variety of parts or small quantity runs where fixtures would be too costly? Or short to medium cycle runs where you could *re-use* compound for several runs? Lack of floor space for several machines? An Almco custom-designed multi-compartment barrel may give you a cost-saving answer. Automatic forward and reverse. Any combination of compartments and doors.



SUB-O-MATIC AUTOMATED SYSTEMS

Almco's exclusive submerged unit is an automatic, "assembly line" system for micro-precision deburring and finishing of small parts in quantity. Saves labor, speeds up processing and flow of high production parts. One man for example can operate this equipment and handle as many as 192 barrel loads per 16 hr. day. Slashes compound expense to minimum because compounds can be re-used for days at a time. These submerged systems can also be obtained in non-automated, straight line systems.

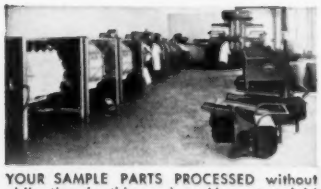


CUSTOM-DESIGNED BARRELS

Almco designs and manufactures special barrels of all types for problems where standard equipment cannot be effectively used. These range from the smallest type to the largest fixture barrel such as the 60" diameter x 60" length barrel shown above. Special large diameter barrels with double flat or triple flat doors are also available to accommodate extra large parts and to allow abrasive media to flow freely over the outer periphery of the part. Your special problems may be solved with one of Almco's custom-designed barrels. Material handling systems can also be closely coordinated with special barrels.

SMALLER MACHINES

Twin barrel machines manufactured by Almco are the standard of the industry for shops processing small lots of parts and for companies with large lots of small parts. Also ideal for sample processing, barrel finishing research and development work, and as auxiliary equipment. These units are Almco engineered to the highest specification standards and include operational and safety features found on larger Almco machines.



YOUR SAMPLE PARTS PROCESSED without obligation in this modern Almco test lab! Simply write on letterhead for address of nearest Almco lab or send parts direct to Albert Lea, Minn. Enclose specifications desired. Complete free report includes recommendation. 52 PAGE BARREL FINISHING HANDBOOK SENT ON REQUEST.

Almco deburring and finishing machines are ruggedly constructed to perform on a round-the-clock basis. They incorporate the best engineering design required in the industry — your assurance of versatility and economical processing of work parts. Optional equipment includes material handling devices and systems, automatic forward and reverse, double or triple flat doors, single and dual timer controls for automatic delay starting and stopping, perforated drain doors for flushing and rinsing, unloading devices, etc. Also a full and complete line of Almco Supersheen barrel finishing compounds and media of all types made especially for use with Almco precision barrel finishing equipment.

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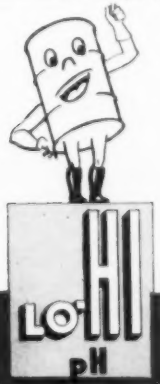

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1. TEN-KEY model adding machine, seen above, is encased in an aluminum die-cast housing. Finished in the new hard-dull colors, this machine is attractive. Its die-cast case seen at right, before and after finishing, needs no pre-finish machining before painting due to the smooth surfaces.

2. BIG DIRECTOR line of electric adding machines is represented by the above machine housed in aluminum die-cast case seen at upper right, and coated with the newly developed hard dull paint, seen at lower right. The Director line is multiple-total, with various capacities. Colors chosen were picked on the basis of popular 10-key line colors, hues picked as a result of the extensive survey conducted.

The designers made it possible to market a newly styled line of office machines with added appeal because . . .

Die Castings Can Be Color

WHEN the Burroughs Corporation, with headquarters in Detroit, Michigan, began looking for new styles in office and business machines, their first step was to conduct a market survey. Results of this survey were incorporated into the new design.

And what did the survey indicate was wanted by people working in various offices all over the world? It showed that there was a great desire for color, something to add vivacity to office atmosphere.

This information set Burroughs' finishing experts to developing a new type of smooth, attractive finish which they have dubbed the *hard-dull* finish that creates no glare or reflection.

But the best surface on which this firm's staff found this finish could be applied effectively was the smooth, almost perfect surface of a *die casting*.

True, sand castings could have been machined and polished off until smooth enough to take the finish without showing their rough, sand-grain pitted surfaces . . . but cost would be astronomical.

The new finish is also called by another name. It is the *Decorator* color and is applied in Capri Coral, Alpine Blue, Sea Mist Green, and Amber Grey. White is found only on the Ten-Key machines.

The designers wanted a modern, functional piece of office equipment which was simple and attractive in appearance. They feel they have reached this goal with their new colors, especially the pastel, smooth, *hard-dull* finish now being applied to their machines.

The first appearance of the new finish came with the introduction of the Burroughs Ten-Key electric adding machine in March, 1955, followed by use on its Director line of adding and accounting machines in March, 1956. The new colors are applied in a series of steps on an electro-static spray finishing line. The component die-castings which are eventually assembled to make up the Burroughs machines, are hung on a conveyor which carries them through the spray areas, ovens, and drying rooms. The parts are carried at a rate of 10 feet a minute.

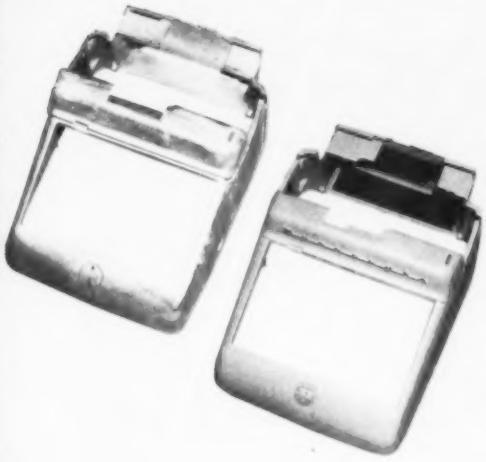
The conveyor line has 300 hooks and makes a complete circuit in one hour, setting the production rate for the finishing operation. As many as 600 Ten-Key machines per hour can be painted by hanging two on each hook.

Before being painted, the parts first go into a detergent cleaning bath. They are sprayed for one minute with water heated to a temperature of 160°F. Next they get a minute-long cold rinse. The chilled parts are then bonderized to prevent corrosion and to prepare the surface of the casting for the finishing coat of *hard-dull* paint it is about to receive. This bonderizing is done in a 16% solution.

Again, they go through the cold water rinse for one minute. Then these castings get a fast cleaning as they are rinsed in chromic acid for 45 seconds. This neutralizes any of the bonderizing solution which might be retained on the part's surface.

Last step in the pre-finishing line comes next when the castings move into a heating oven for a period of 10 minutes. Temperature in there is held at 300°F. After the parts leave the heating oven, they are allowed to cool and are removed manually from the line's hooks.

They are then re-hooked onto the painting line. This begins with a hot electro-static spray-coat. The paint is atomized and charged onto the surface of the castings at a temperature of 150°F. This spray op-



3. DIE-CAST case for this Director model machine, seen above, has been coated with the hard-dull finish without any finish-machining operations beforehand. The original die casting is seen at right. The painted housing is seen at lower right.

DIE CASTINGS

Finished Without Machining

eration lasts for only 10 seconds before the parts move on.

After the coat is deposited on the casting's surface, a very necessary operation takes place which gives the *hard-dull* color its smoothness and even tone. This is a period known as "flow-time". It is during this space of 15 minutes that the paint moves over part's surface, evening itself by means of its own natural viscosity so that a consistent thickness of the paint film is obtained before drying.

On the die castings, as they are now being finished at the Burroughs Corp. plant, this film is deposited and spread over the casting's surface in a layer that is one and one-half mils in thickness.

At the end of the 15 minute flow-time, the coated, still-wet parts are carried on the conveyor into the baking oven.

They move slowly through the oven, being transported from it after a period of 30 minutes. By this time the finish coat is firmly set and baked hard. The oven is maintained at a constant baking temperature of 400°F. After leaving the oven, the die castings, now covered with the specified coating of *hard-dull* finish, cool slowly as they pass through the open air at room temperature. When they become cool enough to be touched, the parts move to an area where they are checked for surface touch-up.

Even though die-castings have a traditionally smooth surface, there are small depressions and perhaps, even a rough spot or two which may be found on some of them. Thus, after cooling, they are checked by men who go over the newly applied coating, looking for any roughened areas on the casting's surface. These are carefully sanded until they are smooth enough to pass Burroughs' rigid tests.

As for any of the slight depressions sometimes found in die castings, these are located quickly and filled with putty.

After each and every low spot is filled with putty and rounded off, the castings are set aside while the filler dries. After hardening, any excess putty is carefully sanded away.

After sanding, the parts are again hung on the long conveyor line and move to the electrostatic spray booths for their second coat of *hard-dull* finish.

Paint, chosen from any one of the several *hard-dull* colors, is electrically charged and deposited on the parts. The temperature of the atomized paint is still maintained at 150°F. There is a very good reason for this high paint-temperature.

It is *economical*.

It makes the paint much more fluid and avoids a need for a large amount of thinner. This saves mixing time, labor costs, and avoids a fire hazard.

The second layer of paint is the final, finishing layer of *hard-dull* coating. It is deposited in a time period of 10 seconds.

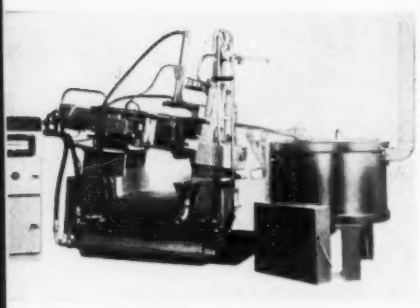
Parts then re-enter the baking oven where the second, all-important color-coat is baked on at a temperature of 400°F, making this finish firm and abrasive resistant. After 30 minutes in the oven, the coated die-castings are conveyed into a cooling area where they remain until the heat dissipates. After cooling, they are stored until needed in assembly.

Rates of production are high on Burroughs' finishing line, with up to 600 Ten-Key housing parts being processed per hour; or, 300 of the larger, Director cases per hour.

NEW PRODUCTS AND DEVELOPMENTS

Want complete details on these announcements? Use the Reader Service Cards. You'll find them facing page 58 of this issue

SMALL DIE CASTING MACHINE IS FULLY AUTOMATIC



The first, commercially available, fully automatic small die casting machine will produce 1 lb. zinc alloy castings at production rates often exceeding 1500 shots per hour.

The DCMT RAM Automatic manufactured by DCMT Sales Corp., Div. of British Industries Corp., is designed to perform all operator functions in a fool-proof manner. Operations include machine cycling, die cleaning and lubricating, inspection for foreign matter in the die, water control, replenishing molten metal supplied to the machine and picking off castings. The machine operates positively and automatically on every cycle with split-second timing. Elimination of operator variables increases output ond improves casting quality and finish.

Circle No. 205 on Reader Service Card

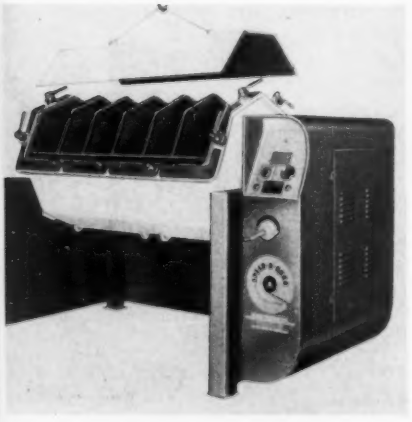
SINTERING PRESS SIMPLIFIES SET-UP, TOOLING, CONTROL

The new Stokes Model 640 50-ton multiple-motion powder metal press provides extra cost savings through simplified tooling, centralized set-up and control, and maintenance-free design. The press, manufactured by F. J. Stokes Corp., includes the following features: 1. The addition of a second independent upper punch. This makes possible the production of uniformly dense flanged parts with double hubs. Greater flexibility of punch timing and powder transfer are also assured; 2. All motions of a cycle are controlled by sequence controlled timing; 3. Single-cycle controls are standard equipment. This simplifies tool set-up and permits parts with inserts to be compacted readily; 4. Standard equipment also includes a under-fill or pre-pressing control. This permits repositioning of powder in the die, and thus aids production of multiple-level parts. The puffing of ends, when thin parts are being compacted, is also eliminated.

The press is designed for full 50-ton ejection breakaway, combined with full support of the part. One actuating lever for both lower punches in compression, breakaway, or injection assures simultaneous ejection by both lower punches.

Circle No. 206 on Reader Service Card

NEW BARREL FINISHER HAS MULTI-USES

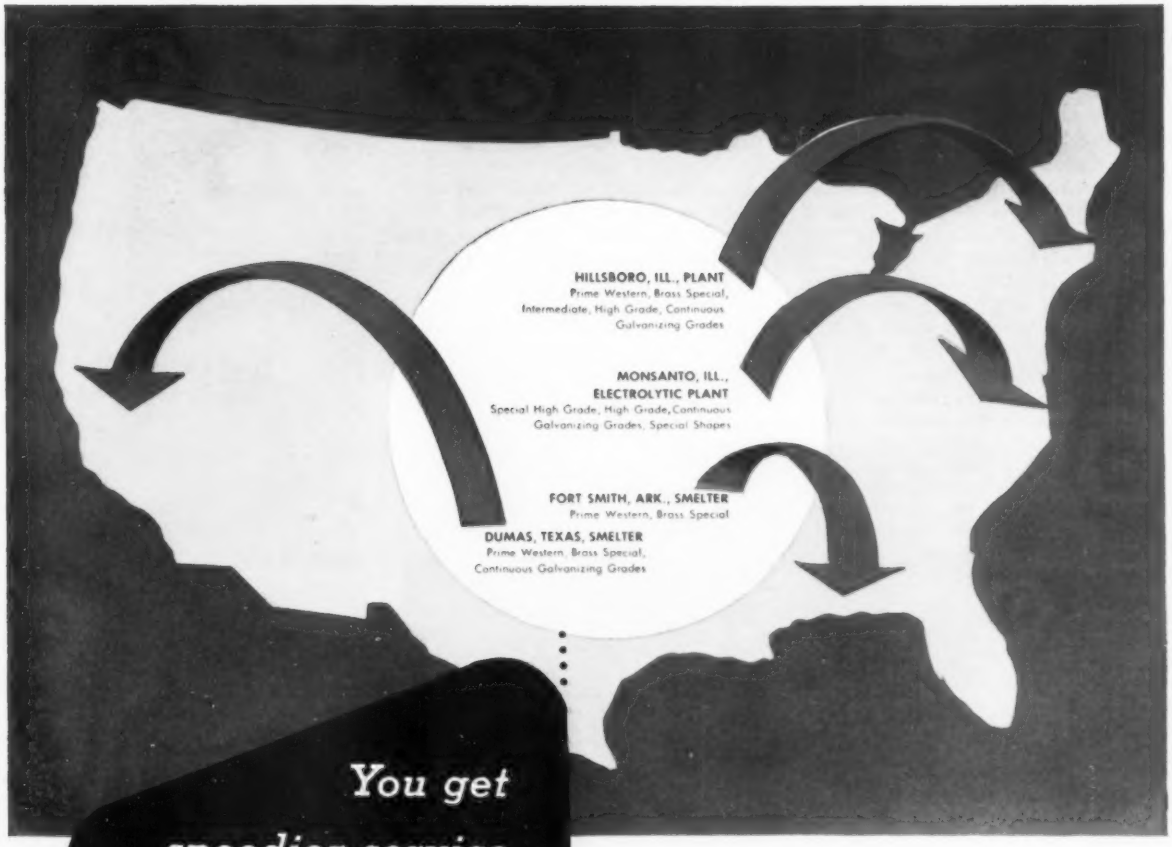


The Multi-Function Fixture Barrel is a single piece of equipment capable of doing many jobs of barrel finishing and deburring. This especially designed barrel, manufactured by Speed-D-Burr Corp., comes in sizes ranging up to 120″ I.D. and can be used in any of three ways. 1. For large loads it may be used as a single cavity barrel. 2. Insertion of an optional compartment type container, into the main barrel, provides six or more separate divisions, each capable of holding a different job and type of media. 3. The placing of a custom holding fixture provides an economical means of finishing parts up to 118″ in length. Any of these changes can be made quickly.

The entire top three-panel section may be easily removed for placement or removal of large work pieces or holding fixtures, or for inserting the compartment section. The cover is held in place by cam-action lever locks, and is leak-proof. In the opposite panel are two inspection doors offering accessibility to all compartments. These doors are self-contained, hinged to the barrel, and have positive action locks.

Circle No. 207 on Reader Service Card

Continued on page 70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Prime Western, Brass Special, Intermediate, High Grade, Continuous Galvanizing Grades
MONSANTO, ILL., ELECTROLYTIC PLANT
Special High Grade, High Grade, Continuous Galvanizing Grades, Special Shapes
FORT SMITH, ARK., SMELTER
Prime Western, Brass Special
DUMAS, TEXAS, SMELTER
Prime Western, Brass Special, Continuous Galvanizing Grades

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For more information circle No. 17 on the Reader Service Card

NEW PRODUCTS—
continued from page 68

DRILLING MACHINE
. . . is for extra accuracy

Precision tool room drill presses, featuring a production type tables with lifting mechanism and multiple head floor type bases, have been announced by The Electro-Mechano Co.

The machines are designed to provide a moderately priced drill press for precision work in laboratory or production. Features include: Spindle run-out held to a minimum; accurate table squareness to the spindle; a specially selected chuck; continuous variable speed control system.

Circle No. 213 on Reader Service Card

STRIP CHART RECORDER
. . . features instant operation

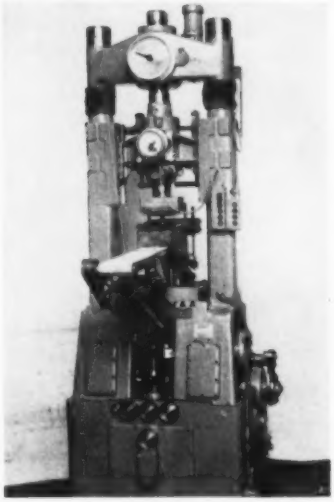
The Marksman strip chart potentiometer recorder functions instantly — without warm-up.

The unit, manufactured by West Instrument Corp., will record any variable that can be transformed into an electric signal through transducers — strain, pH, temperature, pressure, etc. It operates at 115, 208 or 230 volts and requires no additional transformer.

Features include automatic standardization, thermocouple break protection, cold junction compensation, adjustable chart speeds without changing gears.

Circle No. 219 on Reader Service Card

100 TON SINTERING PRESS
. . . has multiple action



A multiple action 100 ton powder metal press has been introduced by The Dorst Division of Arnhold Ceramics Co. Fully mechanical, the press has a hydraulic pressure indicator, 100 ton ejection power and a 7 1/16" fill.

Controls are centrally located with micrometer adjustment for: floating die action; independent fill for tools with several fill levels; independent timing adjustment for compression from top to bottom; ejection adjustment. Positive stops support die, bottom punch and movable core rod during final compacting.

Circle No. 208 on Reader Service Card

COMPLETE pH PACKAGE
. . . for multi-station use

A pH package for multi-station use is being offered by Analytical Measurements, Inc. The complete kit of 5 portable instruments, comes with carrying cases and buffer solutions, 2 buffer kits, 2 extra probes and 2 sets of batteries. This entire package, designed to meet the growing need for multi-station pH control, sells for $500.00.

Circle No. 212 on Reader Service Card

FURNACE USES LIQUID GLASS
. . . as a heating medium

A new heating furnace, originally built and introduced in Italy, uses liquid glass in a revolving drum, as the heating medium. To be manufactured by the Bal-Tate Furnace Co., the furnace is designed to handle the heating of ingots prior to extrusion.

Circle No. 215 on Reader Service Card

Hammond OF KALAMAZOO
GOOD MACHINERY SINCE '82

MODERN Self Contained GRINDER-POLISHER

Hammond Variable Speed (1500 to 3000 RPM) Polishing and Buffing Lathe. Models up to 50 HP available.

Hammond Cyclone Duskolector. One of a wide line of Cyclone and Filter Types.

Hammond Backstands. 10 Air and Spring Tension Models to choose from.

Write for Catalog No. 60 showing America's most modern and complete line.

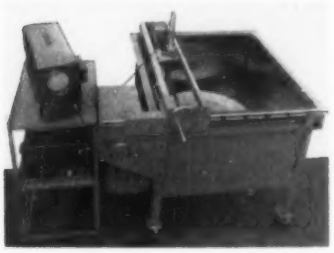
Hammond Machinery Builders INC.

1642 DOUGLAS AVENUE • KALAMAZOO, MICHIGAN

See Us At The Plant Maintenance Show — Chicago Amphitheatre, Booth 1171, Jan. 27-30.

For more information circle No. 137 on the Reader Service Card

FLAW DETECTION
. . . with high frequency



The Ultrasonoscope is a compact instrument for non-destructive testing of metals and other materials. This compact instrument, manufactured by the Ultrasonoscope Co., uses electrical impulses as its principle of operation. The impulses are converted to mechanical vibrations and transmitted, by a barium transducer mounted in a probe, to the specimen being tested. A portion of the waves produced are reflected back to the probe by the far boundry of the specimen or by any flaw which is met. The waves are then reconverted back to electrical impulses where they are amplified and transmitted to an oscilloscope. The position of the deflections along the track of the time base is proportional to the echo time. This gives an indication of flaw positions.

Circle No. 209 on Reader Service Card

CONTROL MAINTAINS TEMPERATURES
. . . within spread of 1° F.

A simplified proportioning control has been introduced that makes it possible to maintain temperatures within a total spread of as little as 1°F.

The control, developed by Assembly Products, Inc., can control temperatures anywhere from minus 200° to 3000° F., and may be used to monitor many other variables with precision.

Designated Model 200, the unit can be mounted on table top or in a panel.

Circle No. 211 on Reader Service Card

ULTRASONIC GENERATOR
. . . for production use

A ultrasonic cleaning generator that will remove insoluble soils and contaminants quickly is being manufactured by Branson Ultrasonic Corp. The Sonogen Model AP-200 will easily wash out oil in sintered parts, blind holes, and complicated crevices.

The unit measures 25″ x 17″ x 19″, weighs 175 lbs., has an average power output of 1 kw with a peak of 4 kw on pulses, and plugs into all standard industrial receptacles.

Circle No. 216 on Reader Service Card

MOUNTED DIAMOND POINTS, HONES
. . . now available

A new line of industrial tools is being manufactured with mounted diamond points that range in size from 3/32″ to 1″ in diameter and hones in standard and special sizes, by Abrasive Div., Elgin National Watch Co.

Controlled concentration and uniform distribution of virgin diamond in the resinoid-bonded tools, assure rapid cutting and long life.

Circle No. 226 on Reader Service Card

Continued on page 82

new PROVEN **R-58**

SECTIONAL RUBBER CONTACT WHEEL

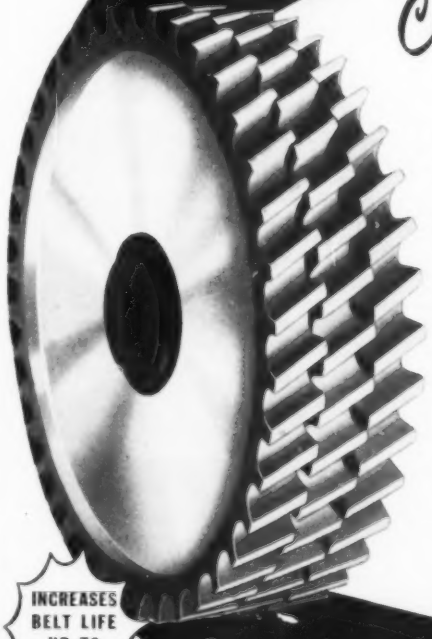
unequalled

Conformability

It actually shapes itself to the work piece . . . conforms to the most difficult contours . . . covers more surface in a single pass.

- CONFORMS BETTER—Grinds even odd shapes. Deep serrations allow it to conform like no other rubber wheel.
- SAVES TIME—Cuts faster, contacts a greater area with each pass.
- BELT LIFE UP 200% and Better-Production tests prove it. It "shells out" belt and prevents glazing.
- LEAVES NO PATTERN ON WORK—Overlapping action eliminates stripe or pattern when more than one section is used.
- LASTS LONGER—Made of new long wearing rubber. If one edge wears, reverse wheel and it operates as effectively as ever.

Write for complete information



INCREASES BELT LIFE UP TO 200% & BETTER

It's The WHEEL That makes the difference ! ! !

A NEW CONCEPT IN RUBBER CONTACT WHEELS

CHICAGO RUBBER COMPANY INC.

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For more information circle No. 133 on the Reader Service Card

USEFUL LITERATURE, CATALOGS, MANUALS

any of these technical publications may be obtained by circling the appropriate numbers on the Reader Service Cards, Pages 58-59

PROCESSES

Investment Casting:
Shaw Process Development Corp.—A booklet describing the Shaw process is now available. The process differs from normal investment casting in that no wax is employed and accurate refractory molds are produced direct from suitable masters or patterns Write on company letterhead to Dept. K38, Shaw Process Development Corp., Port Washington, N. Y.

Die Casting: 154
Apex Smelting Co.—19-page report. This report, which contains the findings of 31 die casting experts from 11 European countries, discusses die casting machines, die design and construction, metallurgy, foundry practice, finishing die castings, and management-labor relations.

Sinterings: 155
Reese Metal Products Corp.—A new booklet, "How To Cut Precision Parts Costs with the Remet Powdered Metal Process", describes what the process is and does. Included are illustrations on good and bad parts-design factors and material specification charts.

Die Casting: 156
Gries Reproducer Corp.—The "Intercast" die-casting process, which permits automatic production of small hinged or linked parts in die-casting, without subsequent assembly, is described in a new folder.

MATERIALS & EQUIPMENT

High-Temperature Alloys: 170
Haynes Stellite Co., Div. of Union Carbide Corp.—"Haynes" alloy No. 25, a wrought cobalt-base high-temperature alloy, is fully described in a 27-page brochure. "Hastelloy" alloy X is a nickel-base high-temperature alloy in both wrought and cast form. Both booklets have sections on physical properties, short-time tensile data, and stress-rupture and creep data.

Diffusion Pumps: 173
NRC Equipment Corp.—Bulletin DP-2 will help you select the high vacuum pump or pumps that are best suited to your needs. Operating principles, performance characteristics, design features, and dimensions, are given.

Temperature Instrumentation: 174
Serdex Inc.—A 6-page catalog presents design and construction details on the company's complete line of humidity indicators, recorders and controllers.

Heating Units: 175
Ispen Industries—A new brochure describes ten exclusive design and construction features of the Ispen model B heat treating units. Features discussed include alloyed ceramic heating tubes; facilities for cooling and quenching; automatic and semi-automatic mechanical loaders and unloaders; etc.

Force Control Switches: 176
W. C. Dillon & Co.—Bulletin 49E lists complete specifications and prices on the company's line of Force Control Switches for controlling mechanical forces electrically.

Hydraulic Fluids: 177
Vickers Inc.—Bulletin No. 1300SA, "Selection, Operation and Maintenance of Hydraulic Fluids for Industrial Machinery", describes the characteristics of petroleum base and fire-resistant hydraulic fluids. Technical data is furnished on how to select the best fluid for a given job, how to care for it, and what to do when trouble occurs.

Beryllium Oxide: 178
The Beryllium Corp.—A new 8-page folder describes "Berylco" beryllium oxide — a refractory oxide of the light metallic element beryllium. Included are discussions on beryllium oxide powder, beryllium oxide crucibles, crucible wash and beryllium oxide shapes.

Vacuum Gauge: 179
Consolidated Electrodynamics Corp.—Bulletin No. P9-11 describes a new sigle-station Pirani vacuum gauge with a contact meter. The meter, Type GP-115, measures, on two scales, the total pressure of condensable vapors and permanent gases in a vacuum system.

Ground Tool Steel: 180
Uddeholm Co. of America, Inc.—A stock chart on precision ground tool steel contains complete information on air-hardening and oil-hardening types. Analyses, hardening instructions, tempering curves, size tolerances, and surface finishes are included.

Clearing Presses: 181
Clearing Machine Corp.—Bulletin No. 234, a 48-page catalog describing the corporation's line of Straight Side Crankshaft Presses, contains a section on each of the following topics: Standard Construction, Features, Accessory Equipment, Press Selection, Specification Tables, and Special Construction.

Dispersions: 182
Acheson Colloids Co.—A new products list has been made available that lists the product, dispersed substance, carrier, solids content, particle size, consistency, density, diluent, flash point, and typical applications in chart form.

Industrial Models: 183
PDD Corp.—A six page illustrated brochure presents the company's facilities for the design and fabrication of industrial prototypes.

Refractories: 184
Robinson Clay Products Co.—A new illustrated brochure, "Castable and Plastic Refractories", is a quick reference to the company's complete line of refactories and vitrified clay products.

Gas Generators: 185
A. A. Straub Co., Inc.—Technical information and specifications are available on endothermic gas generators for the production of gases used in maintaining equilibrium conditions during heat treating.

Conversion Factors Chart: 186
Ainsworth Precision Casting Co.—This reference table, in wall chart form, includes such common conversions as inches to centimeters or watts to H.P. as well as many conversions that are difficult to locate in reference manuals.

Continued on page 75

For FINEST QUALITY And MAXIMUM PRODUCTION!

Designed and built to suit your needs!

COLD CHAMBER AND GOOSENECK TYPES — DESIGNED AND BUILT TO THE SPECIFICATIONS OF PRACTICAL DIE CASTERS AND DEVELOPERS OF DIE CASTING MACHINES WITH OVER 35 YEARS OF EXPERIENCE.

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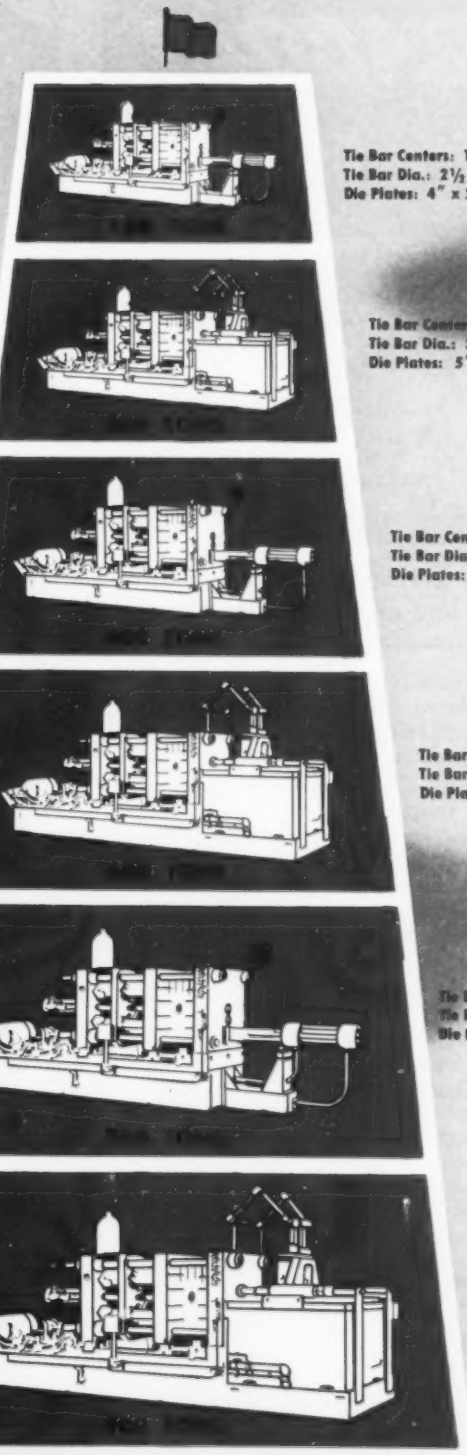

Tie Bar Centers: 16¾" x 14¾"
Tie Bar Dia.: 2½"
Die Plates: 4" x 20" x 22"

Tie Bar Centers: 22½" x 22½"
Tie Bar Dia.: 3½"
Die Plates: 5" x 29" x 31"

Tie Bar Centers: 28" x 24"
Tie Bar Dia.: 4"
Die Plates: 6" x 44" x 30"

Tie Bar Centers: 33" x 33"
Tie Bar Dia.: 5"
Die Plates: 7" x 46" x 44"

Tie Bar Centers: 36½" x 36½"
Tie Bar Dia.: 6"
Die Plates: 9" x 48" x 48"

Tie Bar Centers: 3
Tie Bar Dia.: 6½
Die Plates: 9" x 5

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For more information circle No. 25 on the Reader Service Card

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For chemically polishing, deburring and protecting zinc and aluminum die castings

DURACOAT® DCP-3 and -5. Zinc die cast parts can now be chemically polished by simple immersion. Costly hand or mechanical operations can be eliminated or supplemented with these solutions. Use for reclaiming stripped parts; prior to plating for brighter deposits and increased throwing power into low current density areas, and as a final finish.

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34 Years of Service to the Heat Treating and Metal Finishing Industry

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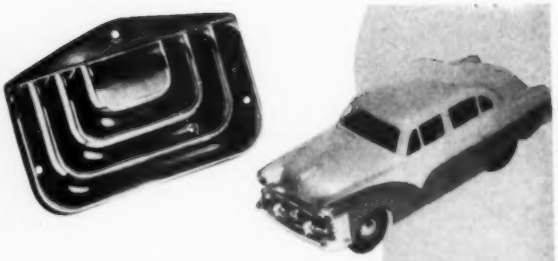

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For more information circle No. 153 on the Reader Service Card

USEFUL LITERATURE

continued from page 72

Synclinal Filters: **187**
Marvel Engineering Co.—A list of fire-resistant hydraulic fluids, by type, brand name and manufacturers name, is available that recommends the correct synclinal filter for use with various aqueous base, synthetic and special fluids.

Diamond Wheels & Tools: **188**
A.I.T. Diamond Tool Co.—Catalog No. 1056 furnishes a technical outline on the correct applications of diamond wheels. Advantages and disadvantages, size and use of diamond particles and the properties and characteristics of diamond wheels are included.

Ultra-strength Steels: **189**
Climax Molybdenum Co.—16-page booklet describes ultra-strength structural steels with yield strengths over 200,000 psi. Included is technical description on all grades of the steel.

Small Die Castings: **190**
Gries Reproducer Corp.—A leaflet, "This is GRC", has been made available to aid in your understanding of the more than 67 different types of standard die-cast and thermoplastic molded items made by the company.

Vacuum-Melted Metals: **191**
Vacuum Metals Corp., Div. of Crucible Steel Co. of America—Technical information is available on vacuum-melted metals that have cleaner, smoother surfaces. The process also improves fatigue, creep and impact strengths, and reduces brittleness.

Magnesium & Aluminum Alloys: **201**
Wellman-Buschman Co., 20-page catalog.—The physical properties and conforming specifications for magnesium and aluminum alloys are listed in this new illustrated brochure. Included are listings for permanent mold and rare earth alloys.

Air & Gas Drying: **202**
C. I. Hayes, Inc.—Bulletin 5703 presents technical data on a new concept in equipment for air and gas drying. The Molecu-Dryer, utilizes a super-induced conduction to obtain continuous operation without the use of blowers, heat exchangers, or purge gases.

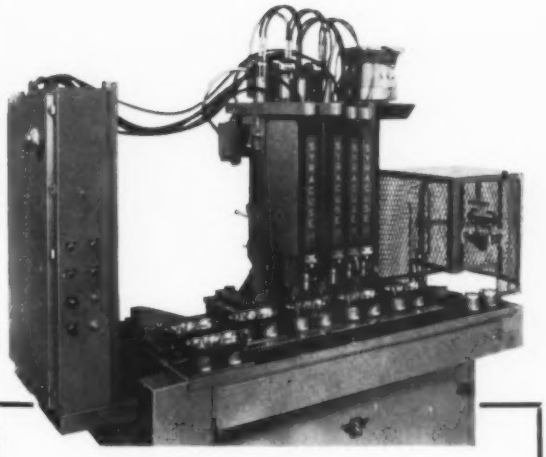
Saturable Power Reactors: **203**
Barber-Colman Co., 32-page bulletin.—Bulletin F-8383 discusses Saturable Power Reactor uses, turn down characteristics, and the application of automatic control to these units.

Die Profiler: **204**
Diamantprodukter AB., 31-page manual.—The Diprofil Manual introduces to the toolmaker a precision instrument for a variety of uses. The tool, its makeup, and operational technique are described.

Presses: **290**
Federal Press Co.—Federal open back — inclinable presses are described in complete detail in a new 18-page illustrated brochure. Technical data, specification charts and special features are included for all of the company's four major press classes: Standard, Dial Feed, Air Clutch and Special Presses.

Valves, Baffles, Traps: **291**
Consolidated Electrodynamics, Rochester Div., 27-page brochure.—Bulletin 10-1 presents selection guides, dimensional data, mechanical drawings, photographs, and operational information as well as complete descriptions, listing the features of each unit, for the company's line of valves, baffles and traps.

Continued on page 77

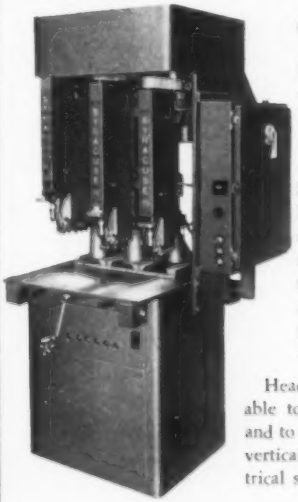


Pallet Transfer Assembly Machine

Standard Sections Permit Variety of Arrangements

Syracuse Special system of pallet transfer provides wide flexibility and permits quick re-tooling. Standard 3, 4, 6, and 8 foot sectional ways with necessary end sections can be combined into practically any size of inline or island arrangement. All pallets are moved simultaneously and accurately positioned. Standard accessories available for stud driving, screw driving and sorting. Equipped with electrical sequence panel and control panel as required.

Automatic Stud Drivers



Quickly Adjustable for Service Work or Wide Variety of Patterns

Syracuse Special Stud Drivers position and drive all studs simultaneously on 4 to 6 second conveyor-to-conveyor cycle. Wide range of hole patterns, quickly adjustable.

Heads are individually adjustable to any height above table and to any angle up to 30° from vertical. Conforms to J.I.C. electrical standards.

For Recommendations, Send Details of Requirements

Syracuse Special Machine Co.

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FOR BETTER DIE-CASTING

AMERICAN METAL ZINC-BASE ALLOYS

In the manufacture of zinc-base alloys at American Metal, Quality Control is a continuing effort . . . pursued through every phase of production . . . to ensure that characteristics are rigidly controlled to give you sounder, more uniform die-castings.

When you specify American Metal zinc-base alloys, you specify:

Premium-grade raw materials •

Sampling and testing at every production step •

Careful supervision and efficient plant and personnel •

Spectroscopic inspection •

Backed by this Quality Control and years of know-how, American Metal delivers the precise zinc-base alloy you order . . . when you need delivery.

Technical assistance and further information about American Metal Zinc-Base Alloys are available upon request.

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AMERICAN METAL CLIMAX, INC.
61 Broadway, New York 6, N. Y.
BOSTON • DETROIT • CHICAGO • LOS ANGELES

USEFUL LITERATURE

(continued from page 75)

Vacuum Furnace: 293
Richard D. Brew, Furnace Div.—Data sheets describe the new Model 420 Brew high vaccum furnace, which is capable of operation at 2200 C. Specifications and operating characteristics are included.

Coreblowers: 294
Beardsley & Piper, 15-page bulletin.—The new Flexible Bulletin, No. 5015, carries information on the new line of Flexiblo Coreblowers. Technical data charts and illustrations for all models are included.

High Vacuum Gages: 295
Consolidated Electrodynamics, Rochester Div., 24-page brochure.—Bulletin 9-1 provides complete technical information on thermal gauges, ionization gauges and a combination thermal-ionization gauge. Included are specification charts, tables and illustrations on all models.

Mold Set Handbook:
National Tool & Mfg. Co., 275-page catalog. National Mold Sets and Accessories, is the title of the new 1957 handbook for mold designers and moldmakers. This catalog-reference book contains detailed platen data, and charts on shrinkage, draft angles and hardness conversion. A copy may be obtained by writing on company letterhead to the National Tool & Mfg. Co., Kenilworth, N. J.

FINISHING

Electroplating: 157
The Diversey Corp.—"9 Ways To Cut Electroplating Costs" is the title of a booklet which brings together both new and old tricks-of-the-trade. The Booklet contains 12-pages of practical tips, ideas and short-cuts to better plating at lower cost.

Filter Powder: 158
MacDermid Inc.—Technical Data Sheet No. 28 describes a filter powder that is compatible with brighteners and never causes roughness in copper. Metex Filter Powder is an insoluble cellulose fiber which will not settle on the work or anodes when current is applied.

Plating Barrel: 159
Hanson-Van Winkle-Munning Co.—Technical literature describes a belt-driven barrel plating cylinder with a newly designed belt drive that allows total submersion of the barrel in all plating solutions.

Vacuum Impregnation Equipment: 160
NRC Equipment Corp.—Bulletin I-2 presents newly available data which demonstrates what high vacuum drying, degassing, impregnating and filling are doing to improve products.

Liquid Buffing Compound: 161
Hanson-Van Winkle-Munning Co.—Bulletin LC-100 describes an automatically applied buffing compound that saves buffing time and increases buff life up to 200%. Installation and three elements of this new "Liquimatic" system are explained and illustrated.

Brush Plating Booklet: 162
Marlane Development Co.—A 12-page booklet, "Practical Brush Plating With the Dalic Process", explains the process, analyzes the metallurgical properties of the deposits, and gives typical time saving engineering applications.

Continued on next page

MEETING DESIGN NEEDS
AT LOWER COST
BRASS POWDER
SAVES
92%
IN PRODUCING THIS RECORDER PINION GEAR

This gear was formerly machined from pinion stock, involving turning, drilling, cut-off, milling and wire brushing operations. Total cost was 74¢ per gear. As a brass sintering the gear is now pressed into finished shape and size in one operation—plus the addition of flats to the pinion head—at a cost of 5.8¢ per gear—

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For detailed information on the design, properties, production and application of brass and other nonferrous powder parts you should have a copy of our manual. It will give you 20 case histories of brass and nickel silver powder structural parts to assist in evaluating this means of production in terms of your particular needs.

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USEFUL LITERATURE *cont.*

Soak Cleaner: 163
MacDermid Inc.—Technical Data Sheet No. 45 describes an effective non-etch soak cleaner suitable for aluminum, brass, copper, zinc, lead and ferrous metals.

Plating Barrels: 164
Belke Mfg. Co.—A new Mechnical Plating Barrel Catalog covers all sizes and types from porto-platers to full automatics. Illustrated, the catalog presents complete technical data on the company's products.

Cleaners, Bath Purifier, Additive: 165
Allied Research Products, Inc.—Literature is available on four new cleaners, used in preparing zinc and aluminum castings for Iridite coatings; Zinc bath purifier, ARP ♯12; and Maintenance Concentrate, ARP ♯73, an additive for use with Iridite ♯4-73.

Self-tapping Inserts: 166
Groov-Pin Corp.—A bulletin on the H-Series Tap-Lok Inserts, with Class 3B internal threads, is available. Complete data and specification charts.

Continuous Tumblasts: 167
Wheelabrator Corp.—Bulletin No. 141-D describes the construction and design features of the 26" continuous tumblast. The unit is designed to handle a continuous flow of miscellaneous work at high production rates.

Finishing Paper: 168
Armour & Co., Coated Abrasives Div.—No Load finishing paper is described as being ideal for undercoats, paints, varnishes, lacquers, etc., because it will not fill or clog during sanding. The paper has a tough flexible backing to prevent slipping in the operator's hands.

Pre-paint Products: 169
Turco Products Inc.—Three bulletins on pre-paint products are available: Bulletin No. 108-8 describes Turcoat 4178, an aluminum conversion coating. "What is Turcoating?" presents bonding materials and their recommended uses and specifications. "Specialized Pre-Paint Products", describes the materials necessary for better paint adhesion.

Silicone Compounds: 171
Union Carbide Corp., Silicones Div.—An 8-page data sheet gives the properties and uses of silicone compounds in the 520 series. These compounds are organo-silicone polymers with unusual lubricating and solubility properties.

Mask Washing Machine: 172
Deco Tools, Inc.—Model '68' is a semi-automatic Mask Washing Machine with no internal piping to clog or fill with paint residue. Literature describes this machine that can clean up to 25 coats of wet lacquer from a mask in 15 seconds.

Rust & Corrosion Remover: 296
MacDermid Inc.—A liquid phosphoric acid type material, Matex 157, that can be used to prepare metal and remove rust or corrosion before surface treatment, is described in a 3-page data sheet.

Metal-Working Processes: 297
Turco Products, Inc., 16-page manual.—Cleaning, phosphating, conversion coating, descaling, electroplating and inspecting are among the 57 chemical processes described in this three color, illustrated manual. Nine reference charts are included.

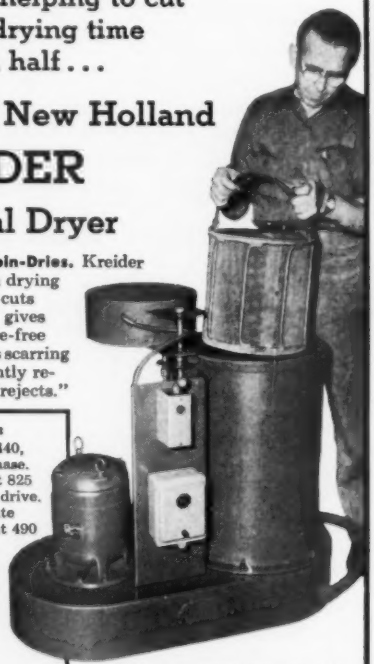
Continued on page 81

This man is helping to cut small-parts drying time just about in half . . .

Model 20 New Holland

KREIDER

Centrifugal Dryer



Air-Dries . . .as it Spin-Dries. Kreider Dryer double-action drying speeds production—cuts costs way down . . . gives you smooth moisture-free surfaces—eliminates scarring and marring frequently responsible for costly "rejects."

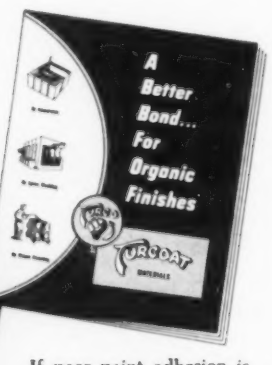
Specifications:
1-h.p. motor—220, 440, 550 volts—2 or 3-phase. Spins 75-lb. loads at 825 r.p.m. Quiet V-belt drive. Arc-welded steel plate construction. Weight 490 lbs. Minimum floor space. Meets N.E.C. specs. Auxiliary electric or steam heating units available as optional equipment. Choose from 3 models.

Send for illustrated 4-page folder. Address Dept. M-581

NEW HOLLAND MACHINE COMPANY
NEW HOLLAND, PA.

For more information circle No. 143 on the Reader Service Card

Poor Paint Adhesion?



Free Manual

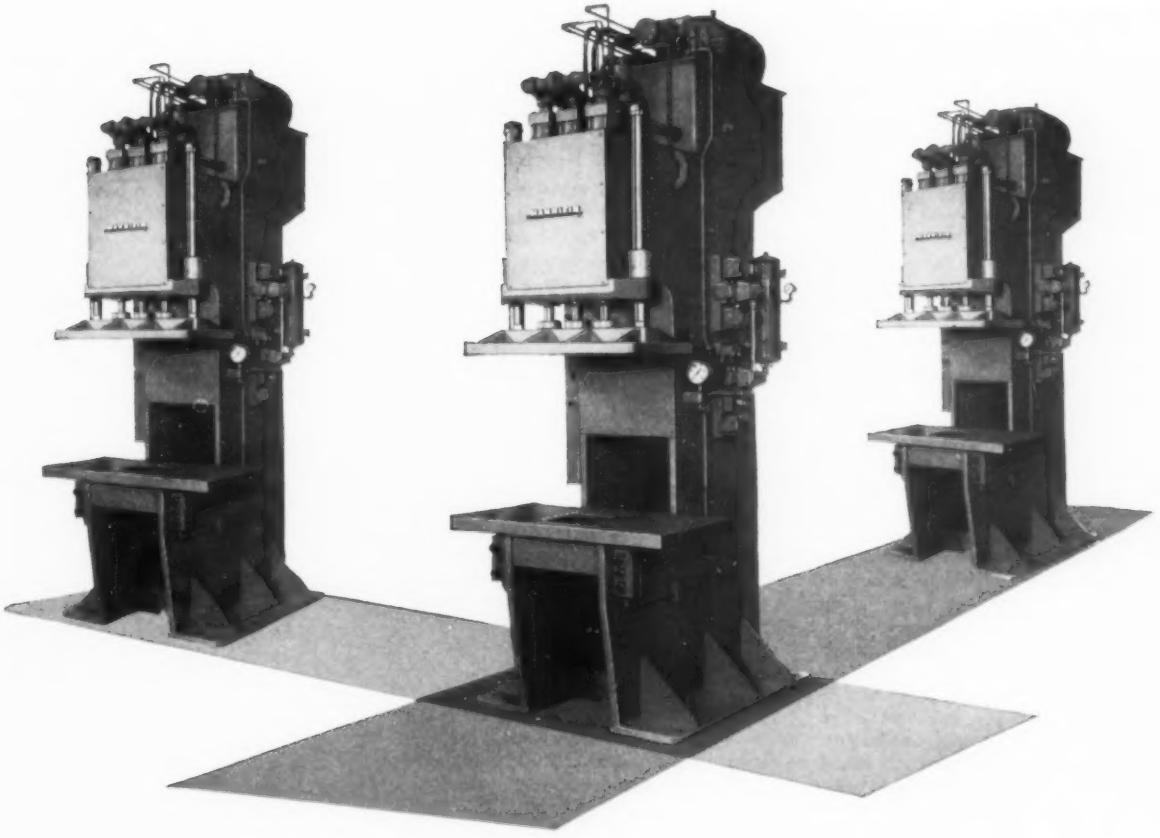
SHOWS HOW PHOSPHATING WILL SOLVE YOUR PROBLEMS

If poor paint adhesion is your problem, chances are you'll find the solution in the Turcoat Phosphating Manual. This booklet describes the complete Turcoat line, tells the full story of phosphating and includes a valuable "Phosphating Reference Chart," which gives the answer to any paint adhesion problem.

TURCO PRODUCTS, INC.
Chemical Processing Compounds
6135 So. Central Ave., Los Angeles 1, Calif.
Factories: Newark, Chicago, Houston, Los Angeles
Offices in all Principal Cities
Manufactured in Canada by B. W. Deane & Co. Montreal

For more information circle No. 149 on the Reader Service Card

Why they trim more castings per hour with Hannifin hydraulics



Die casters who use Hannifin hydraulic Trimming Presses can quickly show you why their production rates are up.

The reason—Hannifin hydraulic Trimming Presses are different. They are specifically designed to take advantage of the desirable characteristics of hydraulic operation, yet fast enough to out-perform mechanical presses.

The really big advantage is the increased flexibility with Hannifin hydraulic power. You can have maximum rated power at any point in the stroke. That means shorter setup time, because it's so easy to adjust the press to trim at the exact point required by the die.

Hannifin presses give operators plenty of room for loading and unloading—with no sacrifice in speed and with the safety of dual controls. Operator fatigue is less because of the smoother, quieter action. Also, the smoother action of a Hannifin hydraulic press produces cleaner trims and reduces deburring and polishing time.

We believe it will pay you to investigate the advantages of Hannifin hydraulic Trimming Presses.

HYDRAULIC

HANNIFIN

PRESSES

Write for your copy of Hannifin Bulletin 142—it tells why users are getting more pieces trimmed per hour with Hannifin high-speed hydraulic trimming presses.

Hannifin Company, 581 South Wolf Road, Des Plaines, Illinois.

A DIVISION OF PARKER-HANNIFIN CORPORATION

For more information circle No. 138 on the Reader Service Card

Advertisement

Special Reports On Finishing Non-Ferrous Metals

NUMBER II—Paint Base, Corrosion-Resistant Finishing with Iridite

WHAT IS IRIDITE®?

Briefly, Iridite is the tradename for a specialized line of chromate conversion finishes. They are generally applied by dip, some by brush or spray, at or near room temperature, with automatic equipment or manual finishing facilities. During application, a chemical reaction occurs that produces a thin (.00002" max.) gel-like, complex chromate film of a non-porous nature on the surface of the metal. This film is an integral part of the metal itself, thus cannot flake, chip or peel. No special equipment, exhaust systems or specially trained personnel are required.

Chromate conversion coatings are well known and accepted throughout industry as an economical means of providing corrosion protection, a good paint base and decorative finishes for non-ferrous metals. However, continued developments have been so rapid and widespread that many manufacturers may not be completely aware of the breadth of application of this type of finish. Hence, this digest of current information; to bring you up to date on the many ways in which you can obtain proper surface preparation for painting and increase product durability with a single multi-purpose chemical pretreatment. Report I on decorative, corrosion-resistant finishes and Report III on chemically polished, corrosion-resistant finishes are available on request.

First, it is an accepted fact that metal surfaces should be prepared before painting to make possible an efficient paint system. Naturally, this preparation should provide for good initial paint adhesion. Chemical treatments have proved extremely effective in this respect, particularly those of a neutral or preferably acid nature. Further, to be most efficient, chemical treatments should provide a non-porous barrier to maintain adhesion by sealing the metal from the paint and moisture. They should also provide a self-healing film which prevents lateral corrosion in the event that bare metal is exposed through scratching.

The Iridite chromate conversion coatings meet all these requirements. Iridite is a chemical conversion treatment for surface preparation. It provides initial paint bonding by molecular adhesion. It is acid in nature and produces a film that is gel-like and non-porous in structure. Thus, the Iridite film effectively seals the metal from the paint and from moisture penetration. Because the film contains certain relatively soluble constituents, it will protect areas scratched through to bare metal and prevent lateral corrosion. This is accomplished by a gradual leaching of these constituents into the damaged area.

Further, because of its gel-like, non-crystalline nature, the Iridite film will not affect the appearance or texture of the paint film, nor will it dust or powder to mar the painted surface. Because the film is non-porous, paint coverage is increased, thus substantial savings in paint costs will be realized. In addition, treated parts may be stored for long periods of time prior to painting without the risk of entrapped moisture causing blistering when painting.

Iridite chromate conversion coatings are widely used with equal ease and success under both baked and air-dried paint systems. While the actual adherence properties of the Iridite film do not increase appreciably with its thickness, corrosion protection does. The protection of the Iridite film is proportionate to its thickness and should be taken into consideration when selecting the Iridite to meet your needs. However, it is sometimes necessary to sacrifice maximum corrosion protection for appearance when a finished part is to be only partially painted. For example, it may be desirable to use a thin, clear, bright Iridite film if the unpainted areas must present a chrome-like appearance. A typical case is that of instrument housings on which the exterior is painted and the inside left unpainted.

On the other hand, if all surfaces of the product are to be painted and maximum corrosion protection is required, the heavier and most protective Iridite films should be used. For example, all surfaces of zinc die cast fruit juicers are finished with a highly protective Iridite film prior to painting to provide maximum resistance to the corrosive action of fruit juices.

Iridite finishes are now available for all commercial forms of the more commonly used non-ferrous metals, including zinc, cadmium, aluminum, magnesium, silver, copper, brass and bronze. In addition to providing an excellent base for paint, the Iridite films also have high decorative value when used as final finishes in themselves.

These films can produce a wide variety of pleasing appearances including clear bright, iridescent yellow, bronze, olive drab and brown. In addition, many films can be modified by bleaching or by dyeing. Among the dye colors available are various shades of red, yellow, green, blue or black.

In planning or designing, you should consider the many other characteristics of Iridite finishes which may enter into the specific problem. In addition to their functions as protective and decorative finishes, and as bases for organic finishes and bonding compounds, Iridites have low electrical resistance. Some can be soldered and welded. The film does not affect the dimensional stability of close tolerance parts.

Iridites are widely approved under both Armed Services and industrial specifications because of performance, low cost and savings of materials and equipment.

You can see then, that with the many factors to be considered, selection of the Iridite best suited to your product requires the services of a specialist. That's why Allied maintains a staff of competent Field Engineers—to help you select the Iridite to make your installation most efficient in improving the quality of your product. You'll find your Allied Field Engineer listed under "Plating Supplies" in your classified telephone book. Or, write direct and tell us your problem. Complete literature and data, as well as sample part processing, is available. Allied Research Products, Inc., 4004-06 East Monument Street, Baltimore 5, Maryland.

For more information circle No. 129 on the Reader Service Card

USEFUL LITERATURE *Cont.*

Forgings: 192

The Journal of the Die Forging Industry—Volume 22, No. 1 of the journal presents articles on forged suspenders for aircraft and other forging uses.

Thermocouple Extension Cable: 193

Claud S. Gordon Co.—Bulletin No. 1200-3 details the various Serv-Rite thermocouple extension cables which are carried in stock. A new extension wire, available in multipair cables with an over-all polyvinyl plastic sheath, is also described.

Commercial-Grade Zirconium: 194

Columbia-National Corp.—"Technical Digest on Commercial Grade Zirconium", is the title of a new booklet that reviews established and potential applications for zirconium. A discussion on methods of fabrication is included with charts on the physical and corrosion properties of the metal.

Melting Furnace: 195

Ajax Engineering Corp.—The characteristics and operation of the company's new 60 cycle Ajax-Junker coreless induction melting furnace, for ferrous and non-ferrous metals, are presented.

Dispersions: 196

Acheson Colloids Co.—The revised bulletin, "'Dag' Dispersions for Industry", lists collodial and semi-collodial dispersions of graphite, molybdenum disulfide, mica, vermiculite, iron oxide, acetylene black, and copper.

Mold and Die Components: 197

Manco Products, Inc.—Accu-Cast, a comprehensive process for the custom fabrication of mold and die components, cavities and cores, hobs, and inserts, is described in an informative 4-page bulletin.

Hydraulic Presses: 198

Lake Erie Machinery Corp.—Bulletin 157 describes, the engineering and production facilities of the company. Included is a list of the equipment available for the manufacture of developed designs or the design, machining, assembly and testing of new machinery.

Ionization Tube: 199

Consolidated Electrodynamics Corp.—Bulletin No. P9-10 describes a new Bayard-Alpert type of vacuum ionization tube which indicates ultra-low pressures in the 10^{-12} mm Hg region and at the same time posesses excellent sensitivity of 100 microamperes per micron.

Filter-Separator Unit: 200

Richmond Engineering Co.—A new data file on the RECO 15-gpm filter-separator includes a check list of 49 industrial and commercial liquids which can be continuously cleaned by the unit. Included is information on specifications, construction features etc.

Countersinks:

M. A. Ford Co.—Bulletin 702 gives specifications and prices, on H.S.S. and Carbide Uniflute Countersinks. A method on how to re-sharpen the tools in your own shop is included. The bulletin may be obtained by writing on company letterhead to: M. A. Ford Co., 1545 Rockingham Rd., Davenport, Iowa.

Safe Cleaning Solvent: 298

Harco Chemical Co.—Technical literature describes a new safety cleaning solvent for wipe or dip cleaning of greasy and oily machine parts and electrical equipment. The cleaner does not have a flash point under normal usage.

Dry Salts For Metal Finishing: 299

MacDermid, Inc.—Data Sheet No. 50., describes Matex Etch Salts, a dry fluroide bearing salt that replaces liquid hydrofluoric acid in metal finishing treatments.

Bata cuts mold cleaning time in half with Pangborn Hydro-Finish

Bata Shoe Co., Belcamp, Md., used to clean shoe molds by pickling. For a better cleaning job, Bata replaced this process a year ago with Pangborn Hydro-Finish. Today this machine gives Bata top quality cleaning, does the job *in half the time* required by pickling and has required "no maintenance whatsoever." Also, acid disposal problems have been eliminated.

Says Mr. Albert Kotras, Research, "We thought it was sales talk but the Hydro-Finish has lived up to every claim the Pangborn representative made." Convinced by the performance of its Hydro-Finish machine, Bata management now plans to order a second one.

Today, through new design and use of air jet sluriators, Pangborn Hydro-Finish costs less originally, costs less to maintain and gives you easier handling and added efficiency. Write for Bulletin 1403 to PANGBORN CORP., 3500 Pangborn Blvd., Hagerstown, Md. *Mfrs. of Blast Cleaning and Dust Control Equipment.*

USE PANGBORN HYDRO-FINISH FOR:

Deburring • Surface finishing • Finishing threaded sections • Improving cutting tool life • Maintaining dies and molds • Removing grinding lines • Removing heat treat scale • Preparing surfaces for coatings, platings, etc.

Pangborn

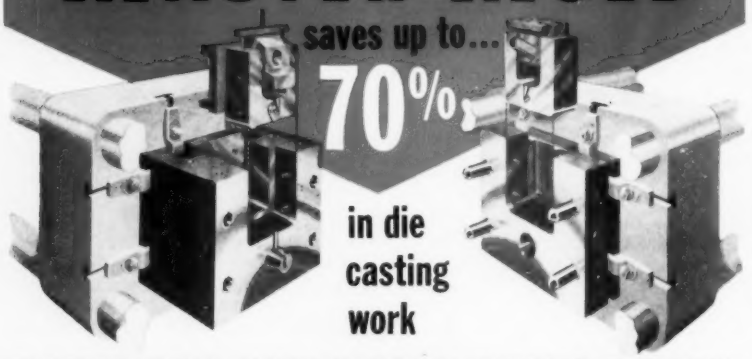
BLAST CLEANS CHEAPER

For more information circle No. 147 on the Reader Service Card

For more information circle No. 112 on the Reader Service Card

MASTER-MOLD

saves up to... 70% in die casting work



MASTER-MOLD WITH PERFECT THERMO BALANCE

- CUTS DIE COSTS
- REDUCES SET UP TIME
- SAVES STORAGE SPACE
- MAKES SHORT RUNS PROFITABLE
- AVAILABLE IN SINGLE OR DOUBLE IMPRESSION UNITS

For additional information and prices write to

RICHARDS TOOL AND MOLD CO.

With a MASTER-MOLD installation, you eliminate expensive die sets, leader pins, sprues and sprue cutters plus the expense of handling such heavy equipment.

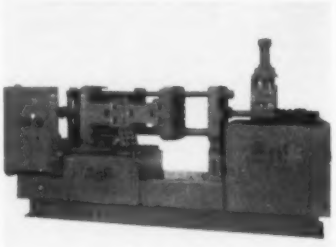
Set up time is reduced — no large die blocks to set in place, remove or pre-heat, because MASTER-MOLD cavity blocks can be interchanged in minutes. Eliminate need of large storage space. Increase productive area.

This method of lowering die costs makes short runs profitable, which means that you can now profitably expand your list of customers to include the many smaller manufacturers and experimental workers who formerly found die casting too costly.

2715 LATHROP AVENUE • RACINE, WISCONSIN

NEW PRODUCTS—
continued from page 71

DIE CASTING MACHINE . . . has 7 lb. shot capacity



A new hydraulic die casting machine, Model 5000, has a capacity of 7 lbs shot in zinc alloy. Manufactured by The ABC Die Casting Machinery Co., the machine features a 150 ton locking pressure, 2½" tie bars with 24" x 24" plates, 8½" die opening and extra large capacity melting furnace with high cycling speeds. The machine is convertible to aluminum with a cold chamber attachment.

Circle No. 229 on Reader Service Card

Continued on page 84

WE'RE NOT *Boasting-* *just d--- enthusiastic*

WHEN WE SAY THAT THE GREAT RESPONSE and DEMAND for "Phosteem" has been phenomenal

There must be a reason!—it's the big Economy in Equipment Investment Costs and Labor Saving in this Low-Cost Quality Method for CLEANING and PHOSPHATING METAL SURFACES for PAINTING

• What are you producing: Cabinets, Busses, Air Conditioners, Farm Implements, Caskets, Bulky Equipment, etc.—High or low production—Quality standards high? PHOSTEEM is adaptable to all of these requirements . . . (And, by the way, also approved by many paint companies.)

N.C.Co.

METALPREP
GALVAPREP
LYFANITE
PHOSTEEM
PREP-N-COTE
AND OTHER
Metal Conditioning
Rust Removing
Phosphatizing
products for
STEEL, ALUMINUM, ZINC, CADMIUM, etc.

SEND TODAY FOR PHOSTEEM BULLETIN 55-137

NEILSON CHEMICAL CO.

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2330 Gainsboro, Detroit 20 (Ferndale), Michigan
Allentown, Penna. Los Angeles, Cal. Windsor, Ontario

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TUMBLE GRAV-I-FLO FINISH OFFERS

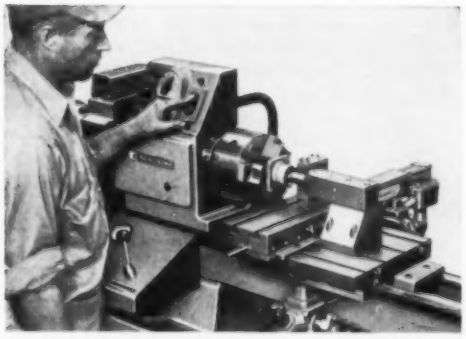
On tumble finishing equipment!

Grav-i-Flo again scoops the field with new lower prices for its standard line of finishing equipment and supplies. Now—gain Grav-i-Flo's experienced know-how plus lower prices—and *really* save! *Send for complete price lists* on 2 compartment machines in sizes 48", 36", 32" and 24"!

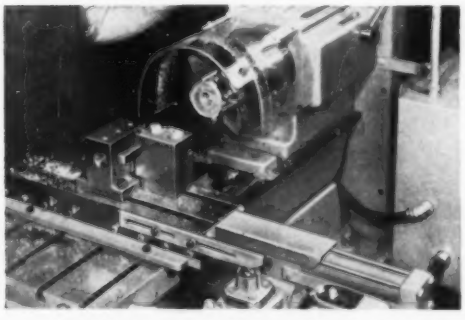
GRAV-I-FLO CORPORATION
400 Norwood Avenue, Sturgis, Michigan
PMM-1

For more information circle No. 135 on the Reader Service Card

If your operations call for turning, boring, facing, forming, grooving, chamfering, beveling, or cut-off of parts such as these (pieces shown merely suggest the almost endless variety), there's a CLAUSING Hydra-Cycle for handling these operations in combination or singly, with great speed, to close tolerances, and at low cost.



All the operator has to do is load the machine, press a button, take out the machined piece seconds later. The Hydra-Cycle does the rest, automatically.



Six surfaces are being machined in the operation shown above. As is the case with most jobs that can be handled by the Hydra-Cycle, the tooling required is simple, inexpensive.

500%

PRODUCTION INCREASE— PROPORTIONATE COST REDUCTION IN SMALL PARTS MACHINING!

MODEL 6405
4 Operating
CYCLES

THE NEW CLAUSING SEMI-AUTOMATIC BORING AND TURNING MACHINE

4 MODELS—ONE TO MEET YOUR EXACT NEEDS

Users report production increases of 200% to 500%, with corresponding cost reduction, and jobs have been held to .0002 tolerance on production runs. Average job change and set-up takes from 15 to 30 minutes. No special jigs or fixtures required . . . simple block tool holders, carbide insert bits and standard boring bars will handle most jobs. Operator merely loads, presses starter button, and unloads finished pieces *seconds later* . . . machining operations are performed automatically . . . simultaneously or in continuous sequence. A time and money saver on short as well as long production runs.

SPECIFICATIONS: 5" x 16" cross slide with 4-11/16" swing, 5" travel; 12" x 14" table with 9" swing, 8" travel. Prices start at $4250 with electricals and hydraulic equipment installed.

NO OBLIGATION OFFER!

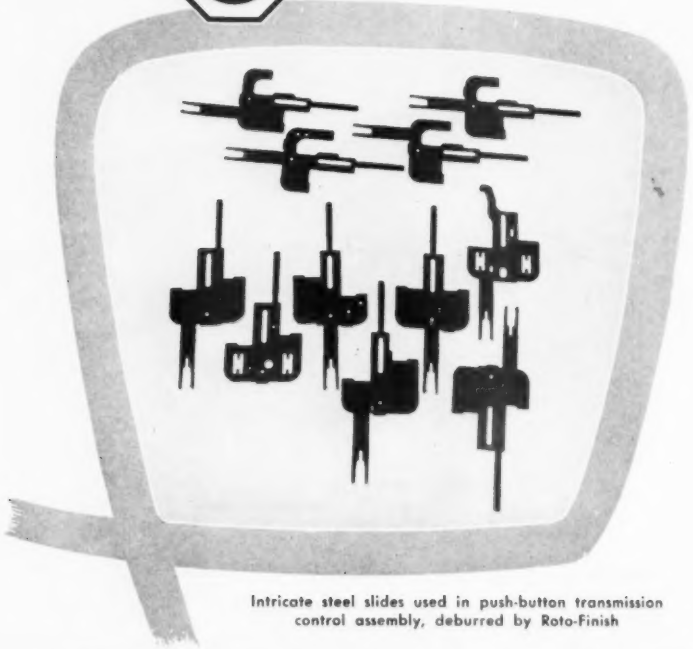
Simply send us complete data . . . drawings of rough and finished part, indicating material, tolerances, finish required, production rate — and, samples of finished and unfinished parts. Our engineering department will gladly make recommendations for the use of the Hydra-Cycle model best suited to your requirements. No obligation. Mail to Hydra-Cycle Department, Clausing Division, Atlas Press Company, Kalamazoo, Michigan.

CLAUSING

CLAUSING DIVISION
ATLAS PRESS COMPANY
1-142 N. Pitcher St. — Kalamazoo, Michigan

For more information circle No. 22 on the Reader Service Card

and the ROTO FINISH® push button driving... story behind it...



Intricate steel slides used in push-button transmission control assembly, deburred by Roto-Finish

3000 PIECES PER HOUR DEBURRED AUTOMATICALLY

That's the story of *one Roto-Finish* machine installed in a Detroit automobile plant to deburr push button transmission control slides. All the operator does is load parts into the machine. The balance of the 30 minute cycle is entirely automatic. Man power savings are tremendous!

PROCESSING MATERIAL COSTS FOR 100 PARTS—JUST 2¼¢. The cost of processing materials, both chips and compound, is .0223¢ per piece.

SEND FOR YOUR FREE ROTO-FINISH HANDBOOK

PUT ROTO-FINISH ENGINEERING SKILL AND OUR YEARS OF PROCESSING EXPERIENCE to work for you. In either your plant or our laboratory, our process engineers will prove, before you buy, that Roto-Finish provides the finish you want at a lower cost. Phone or write today.

Roto-Finish COMPANY

ROTO FINISH®

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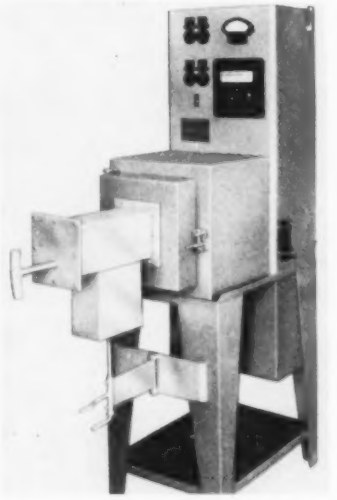
FOREIGN REPRESENTATIVES: ARGENTINA—Taller—Buenos Aires ● AUSTRALIA—A. Flavell Ltd.—Cheltenham ● BRAZIL—Commercial E. Industrial de Fornos Werco, Ltd.—Rio de Janeiro ● CANADA—Canadian Hanson & Van Winkle Co., Ltd.—Toronto ● ENGLAND—Roto-Finish Ltd.—Hemel Hempstead ● FRANCE—Societe Roto-Finish—Paris ● GERMANY, AUSTRIA, NORWAY, SWEDEN, SWITZERLAND—Metallgesellschaft A. G.—Frankfurt, a. M.—Germany ● HOLLAND, BELGIUM, LUXEMBURG—N. V. Roto Finish Maatschappij—Delft, Holland ● ITALY—Societa Roto-Finish a R. L.—Milan ● SPAIN—Instituto Electroquimico, S. A.—Barcelona

For more information circle No. 148 on the Reader Service Card

NEW PRODUCTS—cont.

ELECTRIC FURNACES
. . . for inexpensive heat treating



A new line of controlled atmosphere electric furnaces has been introduced that is designed for the inexpensive heat treating of steel by both small and large users. Manufactured by L & L Manufacturing Co., the "Atmo-Carb" series has a temperature range of 2000°F. The furnaces are complete with a muffle of heavy construction and a fully equipped atmosphere generator.

The MHE series has a shuttle muffle with a loading elevator. The MHD series, a direct loading muffle type with a vertical counterbalanced door, comes complete with a flame seal.

The atmosphere generator provides a process utilizing alcohol as one of the possible atmosphere generating liquids. The atmosphere is useful for clean hardening, carburizing, and preventing de-carburization of straight or chrome nickel steels.

Circle No. 210 on Reader Service Card

ALMANITE
. . . a new high strength metal

This high strength metal combines the best properties of austenitic manganese steel and martensitic white irons. It possesses outstanding wear and abrasion resistance.

Developed by Meehanite Metal Corp., the metal can be used in foundry, metal working and other industries where exceptional wear resistance and hardness is required. The metal can be cast in any form or shape. Structure of

Continued on page 86

If you apply heat to aluminum LINDBERG can show you the better way

Lindberg-Fisher electric resistance melting and holding furnace with Lindberg Autoladle automatic pump.

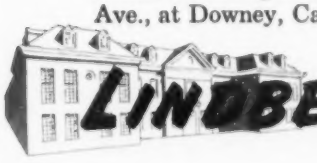
Heat and aluminum have been Lindberg's twin babies for many years. If the manufacture of your product requires the application of heat to aluminum anywhere along the line we can help you do the job better. For years our engineering and research staff has been creating improved methods and developing more efficient equipment in this field.

Most recent development is the Autoladle (we call it "Little Joe"), the first practical automatic aluminum ladling unit yet devised. Used with Lindberg melting and holding furnaces "Little Joe" (shown at the right) makes automatic casting of aluminum fast, dependable and economical.

Lindberg's Melting Furnace Division makes a wide variety of melting and holding furnaces for aluminum, brass, bronze, tin, zinc, lead and other non-ferrous metals. These include aluminum induction, nose-pouring crucibles, electric resistance holding furnaces and big reverbs. For foundry, permanent mold or die-casting plant, independent or captive, there are Lindberg melting and holding furnaces to fit your requirements. If your problem in this field needs a special solution Lindberg's design staff can find it. Just get in touch with the Lindberg plant or the Lindberg Field Representative in your locality, or write Lindberg-Fisher Division, Lindberg Engineering Company, 2463 West Hubbard St., Chicago 12, Illinois. Los Angeles Plant: 11937 S. Regentview Ave., at Downey, California.

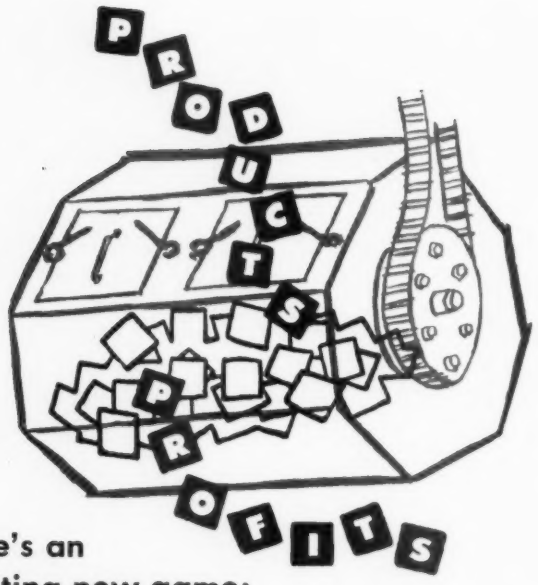
We call it

"LITTLE JOE"



LINDBERG heat for industry

For more information circle No. 82 on the Reader Service Card



Here's an exciting new game:

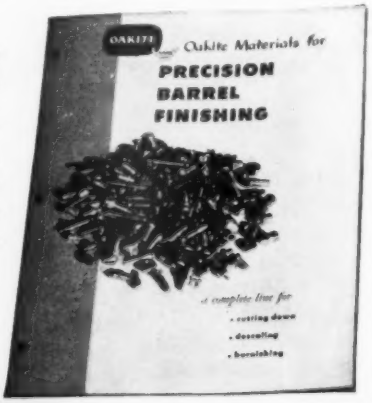
PUT your products in the barrel
TAKE your profits out

One of the greatest money-saving opportunities in metalworking lies in the use of barrels to finish parts by the hundreds in place of conventional methods that finish one part at a time.

Barrel finishing makes easy work of many tough jobs of grinding, deburring and buffing by wheel.

One Oakite customer changed to barrel methods to deburr curved stainless steel strips that are 14 inches long. The cost for deburring 20,000 strips was reduced from $3,000 to $125.00.

FREE For a copy of *"Precision Barrel Finishing"* —containing valuable information on cutting down, deburring, descaling, and burnishing—write to Oakite Products, Inc., 26H Rector Street, New York 6, N. Y.



OAKITE
SPECIALIZED INDUSTRIAL CLEANING
MATERIALS · METHODS · SERVICE
SCIENCE

Export Division
Cable Address: Oakite

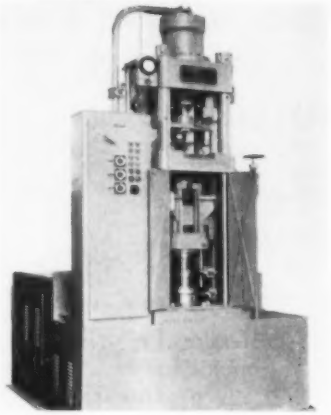
Technical Service Representatives in Principal Cities of U. S. and Canada

For more information circle No. 146 on the Reader Service Card

the metal is similar to heat treated steel. It possesses a better combination of hardness, strength and resistance to impact than either austenitic manganese steel or martensitic white irons. Certain types of the metal have tensile strengths of 90,000 psi with ductility in the neighborhood of 15%.

Circle No. 218 on Reader Service Card

125 TON COMPACTING PRESS . . . is introduced



The new Watson-Stillman 6-125 ton powered metal compacting press is a 4 tie rod type with one pressing motion from the top, one pressing and one ejection motion from the bottom and provisions for a floating die table for a secondary lower and upper motion.

The press, offered through the combined efforts of Haller, Inc. and the Watson-Stillman Div. of Farrel-Birmingham Co., has dual concentric cylinders at the bottom of the press. The outer cylinder supplies bottom compacting pressure and the inner cylinder is for ejection. The stroke of both rams is easily adjusted and locked externally. The lower compression stroke can be locked out of operation with the ejection cylinder operating normally. Both upper and lower cylinders work to positive stops.

The machine is being demonstrated in the powdered metals laboratory of Haller, Inc., where actual production conditions can be observed.

Circle No. 214 on Reader Service Card

NEW PAINT SPRAY EQUIPMENT . . . is introduced

Air-operated paint spray equipment for spraying lacquers, enamels, synthetics, airplane dope, fill-

Continued on page 110

HOW TO SELECT A "PREFERRED" DIE CASTER FROM THE PMM ALPHABETICAL LISTING

*A SINGLE ASTERISK MEANS

MEMBER COMPANY OF THE
AMERICAN DIE CASTING INSTITUTE

The national association of the custom die casting industry. The qualified ADCI members produce over 75% of the nation's annual volume of aluminum, magnesium, zinc and copper alloy die castings produced for sale.

**A DOUBLE ASTERISK MEANS

A PARTICIPANT IN THE
CERTIFIED ZINC ALLOY PLAN

The CZ Plan was developed by the American Die Casting Institute to permit you to select, with confidence, your supplier of zinc die castings. The CZ symbol is your assurance that the castings you buy will meet ADCI and ASTM standard specifications and will possess mechanical and physical properties inherent in zinc die castings produced from metal of proper composition.

ANY ASTERISKS MEAN

DIE CASTING RESEARCH FOUNDATION PARTICIPANT

A PARTICIPANT IN THE
DIE CASTING RESEARCH FOUNDATION

These die casting suppliers have behind them the vast knowledge of improved die casting procedures being accumulated through the Die Casting Research Foundation.

Look for these Marks of Responsibility in Selecting YOUR Die Caster

AMERICAN DIE CASTING INSTITUTE 366 MADISON AVENUE, NEW YORK 17, N. Y.

For more information circle No. 16 on the Reader Service Card

ABRASIVE JET EQUIPMENT developed at the National Bureau of Standards. CO_2 propels abrasive powder through a jet nozzle to the test specimen. Time required to abrade through a test specimen measures its abrasion resistance. This is varied according to operating conditions and the resistance of the coating.

Jet Abrasives Evaluate Organic Coatings

METHODS for measuring abrasion resistance of organic coatings on metals developed by A. G. Roberts, W. A. Crouse, and R. S. Pizer of the National Bureau of Standards, were sponsored by the Navy Bureau of Aeronautics in connection with a program for the production of highly durable, scuff-resistant finishes for naval aircraft.

In this method, the first show of bare metal is readily detected when coating and substrate differ in color. Inspection with a hand lens is also used.

The method works like this: Carbon di-oxide gas under controlled pressure, propels an abrasive powder from a vibrating storage chamber. It passes through a nozzle, impinging at high speed on a test specimen's surface.

A manually operated solenoid valve controls the abrasive flow. Both specimen and nozzle assembly can be rotated in four directions.

Adjustment is made by a graduated, rotating disc attached to the nozzle-shaft. Accurate adjustment of the distance between nozzle and specimen at abrading angles between 20° and 90° is made possible with a calibrated taper-gage.

A vacuum exhaust outlet at one end of the test chamber removes the spent abrasive particles and coating debris. A weighing tube permits rapid monitoring of the flow rate of the abrasive.

A rubber diaphragm perforated to accommodate the tip of the nozzle at one end, and another diaphragm of ordinary filter paper at the other end permits gas to escape while trapping the particles of abrasive.

Operating conditions can be varied to fit extreme differences in materials. These are used most:

- Nozzle-coating distance of .04".
- Gas pressure of 40 psi.
- Flow rate of .15 gps.
- Abrading angle of 90° simulates leading-edge erosion of aircraft in flight.
- Abrading angle of 45° simulates scuffing wear.

Test conditions determine abrasion time for a given material. This time increases proportionally as the distance increases between nozzle and coating. It decreases as pressure rises and as the angle of abrasion drops from 90° to 30°.

Shorter abrading angles cause the necessary abrading-time to lengthen.

NBS studies show that the abrasive jet method distinguishes between materials that are difficult to differentiate by qualitive means.

JANUARY 1958

PMM 2nd Annual DIE CASTING DIRECTORY

PRECISION

METAL

MOLDING

1 ALPHABETICAL

2 GEOGRAPHICAL

3 TRADE-MARKS

ALPHABETICAL DIRECTORY

A & A Die Casting Co.* **
12901 S. Western Ave.
Gardena, Cal.
Metals: A, D, E
Facilities: 1, 2, 5
Trademark: See Section 3

Aallied Die Casting & Mfg. Co., Inc.
10029 Pacific Avenue
Franklin Park, Ill.
Metals: A, D
Facilities: 1, 2, 5

ABCO Die Casting Corp.
330 N. Harding Ave.
Chicago 24, Ill.
Metals: D
Facilities: 1, 2, 5
Tradename: ABCO
Trademark: See Section 3

Ability Die Casting* **
865 N. Sangamon
Chicago 22, Ill.
Metals: A, D, E
Facilities: 1, 2, 5

Accessories Mfg. Co.
5075 14th St.
Detroit 8, Mich.
Metals: D
Facilities: 1, 3, 5, 6

Accurate Die Casting Co., The* **
3089 E. 80
Cleveland 4, O.
Metals: A, C, D
Facilities: 2, 5
Trademark: See Section 3

Acme Die Casting Co., Inc.
746 Albany
Dayton 8, O.
Metals: A
Facilities: 1, 3, 4, 5

Acme Die Casting Corp.
8245 N. Kimball Ave.
Skokie, Ill.
Metals: A, D, E
Facilities: 1, 2, 5, 6

Acme Die Casting Corp.
1635 Murrary Ave.
Racine, Wis.
Metals: A, D
Facilities: 1, 2, 4, 5
Tradename: Acme

Acme Tool & Die Casting Co.
4250 E. Washington Blvd.
Los Angeles 23, Cal.
Metals: A, C, D, E
Facilities: 1, 2, 5

Action-Hopkins Machine & Foundry Co.
2615 2nd Ave. N.
Birmingham, Ala.
Metals: A, D
Facilities: 1, 2, 5, 6

Adept Castings, Inc.
39 Hanse Ave.
Freeport, L. I., N. Y.
Metals: D
Facilities: 1, 2, 5
Trademark: See Section 3

Adjel Products Co.
13561 Helen Ave.
Detroit 12, Mich.
Metals: D
Facilities: 1, 3, 5, 6

Admiral Die Castings
A Div. Portable Electric Tools, Inc.
250 W. 83
Chicago 20, Ill.
Metals: A, D
Facilities: 1, 2, 5
Trademark: See Section 3

**Advance Pressure Castings, Inc.* **
20-30 Wythe Ave.
Brooklyn 11, N .Y.**
Metals: A, D
Facilities: 1, 2, 5
Trademark: See Section 3
Representatives: *East Northport, N. Y.*, Walter Borny, 55 Teaneck Dr.; *Philadelphia, Pa.*, Robert Baron, Presidential A-710; *New Britain, Conn.*, Henry Ohlson, 150 Greenwood St.

Advance Tool & Die Casting Co.* **
3760 N. Holton
Milwaukee 12, Wis.
Metals: A, D
Facilities: 1, 2, 5, 6
Trademark: See Section 3
Representatives: *Detroit, Mich.*, MS Sales Co., 723 Fisher Bldg.

Advanced Manufacturing, Inc.
1214 W. 254
Harbor City, Cal.
Metals: D
Facilities: 1, 2, 3, 5, 6

**Ainsworth-Precision Castings Co.
Div. of Harsco Corp.* **
5959 W. Howard St.,
Chicago 31, Ill.**
Metals: A, D
Facilities: 1, 2, 5
Trademark: See Section 3
Representatives: *Rockford, Ill.* E. L. Anderson, R. T. Jacobson, W. C. Bloom, R. E. Bucklin, 2025 Kishwaukee St.; *Chicago, Ill.*, H. C. Jagade, H. Spaet, A. S. Lundgren, 5959 West Howard St.; *Brookfield, Wis.*, R. L. Downing, 1625 Spring Dr.; *Chicago, Ill.*, C. O. Hogland, 1260 North Dearborn St.; *La Due, Mo.*, E. S. Stempfle, 8 Narragansett; *Chicago, Ill.*, E. Steffy, 10337 South Hoyne Ave.; *Racine, Wis.*, R. W. Mayhew, 1608 South Main St.

**Ainsworth-Precision Castings Co.
Div. of Harsco Corp.* **
12600 Berea Rd.
Cleveland, O.**
Metals: A, D
Facilities: 1, 2, 4, 5
Trademark: See Section 3
Representatives: *Cleveland, Ohio*, Arthur Witt, J. Ford Ackroyd, R. W. Castle, R. G. Gomillion, 12600 Berea Rd.; *Louisville, Ky.*, T. H. Pickering, 2013 Newmarket Dr. Northfield Section.

**Ainsworth-Precision Castings Co.
Div. of Harsco Corp.* **
2025 Kishwaukee St.
Rockford, Ill.**
Metals: A, D
Facilities: 1, 2, 4, 5
Trademark: See Section 3
Representatives: See Chicago Plant.

**Ainsworth-Precision Castings Co.
Div. of Harsco Corp.* **
P. O. Drawer 1077
Syracuse 1, N. Y.**
Metals: A, C, D
Facilities: 1, 2, 3, 4, 5, 6
Trademark: See Section 3
Representatives: *Syracuse, N. Y.*, Gordon C. Curry, B. W. Hindman, J. P. Evans, P. O. Drawer 1077; *Trenton, N. J.*, C. Fuehrer, 1912 Pennington Rd.; *River Edge, N. J.*, V. B. Ressler, 176 Greenway Terr.; *Cranston, R. I.*, F. B. Ryan, 30 Lockwood St.; *Pittsford, N. Y.*, P. A. Surdyke, 10 Santa Dr.; *Syracuse, N. Y.*, J. J. Jennings, Jr., R. W. Rosenquest, P. O. Box 1077; *New York, N. Y.*, New York Office, 642 Chrysler Bldg.

Ajax Die Casting & Mfg. Co.
2002 E. 6 St.
Tulsa, Okla.
Metals: A, D
Facilities: 1, 2, 4, 5, 6

Akron Presform Mold Co., The
2038 Main
Cuyahoga Falls, O.
Metals: A
Facilities: 1, 2, 4, 5, 6

Alabama Wire Co., Inc.
Sycamore & Terrace Sts.
Florence, Ala.
Metals: A
Facilities: 2, 4, 5
Tradename: Dimension Die Castings

Alacast Corp.
2229-4th St.
Berkeley, Calif.
Metals: A, D
Facilities: 1, 3, 5, 6

Albany Plating & Die Casting Co.
464 W. 33
Chicago 16, Ill.
Metals: D
Facilities: 1, 3, 5, 6
Tradename: Albanizing

Allen-Stevens Corp.* **
33-53 62nd Street
Woodside 77, N. Y.
Metals: D
Facilities: 1, 2, 4, 5
Trademark: See Section 3

Allmetal Diecast Company
1632 W. Midland Road
Auburn, Michigan
Metals: A, C
Facilities: 1, 5
Trademark: See Section 3

Alloy Die Casting Co.*
2211 Firestone Blvd.
Los Angeles 2, Cal.
Metals: A, B, D
Facilities: 1, 2, 5
Trademark: See Section 3

Almar Metal Arts
1 Water Street
Point Marion, Pa.
Metals: D
Facilities: 1, 3, 6

Alpha Industries
Die Casting Div.
1300 Wheatland Ave.
Logansport, Ind.
Metals: A
Facilities: 1, 2, 4, 5, 6
Trademark: See Section 3

Alumiloy Fabricators, Inc.
202 W. Bennett
Saline, Mich.
Metals: A
Facilities: 1, 2, 5
Trademark: See Section 3

Aluminum Company of America*
Madison & Mannheim Rd.
Bellwood, Ill.
Metals: A, C
Facilities: 1, 2, 4, 5
Tradename: ALCOA
Trademark: See Section 3

Aluminum Company of America*
Garwood, N. J.
Metals: A, C
Facilities: 1, 2, 4, 5
Tradename: ALCOA
Trademark: See Section 3

Aluminum Co. of Canada Ltd.
Castings Div.
15 Brown's Line
Toronto 14, Ont., Canada
Metals: A,
Facilities: 2, 4
Tradename: ALCAN

Aluminum Die Casting Co.*
3452 San Fernando Rd.
Los Angeles 65, Cal.
Metals: A
Facilities: 1, 2, 4, 5, 6
Trademark: See Section 3

Aluminum Diecast Foundries, Inc.
P.O. Box 69
Winchester, Ind.
Metals: A, C, D
Facilities: 4, 5

Ambrit Industries, Inc.* **
1288 Los Angeles
Glendale 4, Cal.
Metals: A, D
Facilities: 1, 2, 5
Trademark: See Section 3

American Aluminum Casting Co.*
332-334 Coit
Irvington, N. J.
Metals: A
Facilities: 2, 4
Trademark: See Section 3

American Casting & Mfg. Corp.
30 Main Street
Brooklyn, N. Y.
Metals: E
Facilities: 1, 2

American Die Casting Co.
850 Pannell St., N.W.
Grand Rapids 4, Mich.
Metals: D
Facilities: 1, 2, 3, 4, 5, 6
Trademark: See Section 3

American Flange Mfg. Co., Inc.
825 S. Kilpatrick
Chicago 44, Ill.
Metals: D
Tradename: Tri-Sure

Amerock Corporation
4000 Auburn Street
Rockford, Illinois
Metals: D
Facilities: 1, 2, 3, 5, 6
Tradename: Amerock
Trademark: See Section 3

Anderson Die Casting & Engineering Co.* **
1000 E. 60
Los Angeles 1, Cal.
Metals: A, B, C, D
Facilities: 1, 2, 3, 4, 5, 6
Trademark: See Section 3

Anderson Tool & Mfg. Co.
3450 N. Kostner Ave.
Chicago 41, Ill.
Metals: A, D
Facilities: 1, 2, 5

Arkansas Die Casting Corp.
Box 26
Harrison, Ark.
Metals: A, D
Facilities: 1, 2, 4, 5, 6

Arrow-Acme Corp.
411 Prospect
Webster City, Ia.
Metals: A, D
Facilities: 1, 5
Trademark: See Section 3

Arrow Aluminum Castings Co.
3135 Berea Rd.
Cleveland 11, O.
Metals: A
Facilities: 2, 4

Art Jack Die Casters, Inc.
36 Goble St.
Newark 5, N. J.
Metals: D
Facilities: 1, 2

Atlantic Die Casting Co.
17740 Clarann
Melvindale, Mich.
Metals: A
Facilities: 1, 2
Trademark: See Section 3

Atlas Auto Products, Inc.
5815 Wilmington Ave.
Los Angeles 1, Cal.
Metals: D
Facilities: 1, 3, 6

Atlas Die Casting Co.* **
362 N. Kelley Ave.
Germantown, O.
Metals: A, D
Facilities: 2, 5
Tradename: Atlas
Trademark: See Section 3

Atomic Die Casting Corp.
7817 S. Claremont Ave.
Chicago 20, Ill.
Metals: A, D
Facilities: 1, 2, 3, 4, 5, 6
Trademark: See Section 3

Auel Industries
Herminie, Pa.
Metals: D
Facilities, 1, 2, 5, 6

Aurora Metal Co.
614 W. Park Ave.
Aurora, Ill.
Metals: B
Facilities: 2, 5
Tradename: Aur-O-Met
Trademark: See Section 3

Automotive Accessory Co., Ltd.
1551 Erin St.
Winnipeg, Man., Canada
Metals: D
Facilities: 1, 2, 4, 5
Tradename: AAC
Trademark: See Section 3

Badger Die Casting Corp.* **
201 W. Oklahoma Ave.
Milwaukee 7, Wis.
Metals: A, D
Facilities: 1, 2, 5
Trademark: See Section 3

Banner Metal Products Ltd.
1680 Kildare Rd.
Windsor, Ont., Canada
Metals: D
Facilities: 1, 2, 5

Banthrico Industries, Inc.
17 N. Desplaines St.
Chicago 6, Ill.
Metals: A, D
Facilities: 1, 2, 5, 6

Barber Die Casting Co. Ltd.
Postal Station "B", Box 240
Hamilton, Ont., Canada
Metals: A, B, C, D
Facilities: 1, 2, 3, 4, 5, 6
Trademark: See Section 3

Barrington Tool & Engineering Co.
335 E. Station
Barrington, Ill.
Metals: D
Facilities: 1, 2, 5, 6

Basic Aluminum Casting Co.
1325 E. 168
Cleveland 10, O.
Metals: A
Facilities: 2
Trademark: See Section 3

Beaut Mfg. Co., Inc.
7500 Tonnelle Ave.
North Bergen, N. J.
Metals: D, E
Facilities: 1, 2, 5, 6

Benda Tool & Model Works
1444 Fourth St.
Berkeley 10, Cal.
Metals: A, D
Facilities: 1, 2, 5

Bendix Foundries

Bendix Aviation Corp.
Teterboro, N. J.
Metals: A, C
Facilities: 2, 4
Tradename: Bendix
Trademark: See Section 3

Benton Harbor Malleable Industries, Inc.
Die Cast Div.
171 Graham Ave.
Benton Harbor, Mich.
Metals: D
Facilities: 1, 3, 5, 6
Trademark: See Section 3

Blaking Co.
921 N. E. Main
Minneapolis, Minn.
Metals: D
Facilities: 1, 2, 4, 5, 6

Blue Ridge Pressure Castings, Inc.*
Bridge St.
Lehighton, Pa.
Metals: A, B, D
Facilities: 2
Trademark: See Section 3

Chas. D. Briddell, Inc.
Crisfield, Md.
Metals: D
Facilities: 1, 3, 4, 5, 6

Brillcast, Inc.
2544 Thornwood, S.W.
Grand Rapids 9, Mich.
Metals: A, D
Facilities: 1, 2, 5

Bruce Mfg. & Molding Co., Inc.
Atwater St.
Plantsville, Conn.
Metals: A, D
Facilities: 1, 2, 4, 5, 6

Bruin Mfg. Co.
607 N. Fourth Ave.
Marshalltown, Ia.
Metals: A, D
Facilities: 1, 2, 5, 6
Trademark: See Section 3

Bucy Mfg. Co.
625 S. Glenwood Pl.
Burbank, Cal.
Metals: A, D
Facilities: 2

Buehrle Engineering Co.
856 E. Broadway
Muskegon, Mich.
Metals: A, D
Facilities: 1, 2, 5
Trademark: See Section 3

Burton Die Casting Co.
G-6427 Davison Rd.
Davison, Mich.
Metals: D
Facilities: 2

Caldwell Casting Co., Inc., The
Market St.
Cambridge, Md.
Metals: D
Facilities: 1, 2, 3, 4, 5, 6

Calko Die Casting Co.
43 Sunnyside Ave.
P. O. Box 552
Stamford, Conn.
Metals: D

Facilities: 1, 5
Tradename: Calko-Stamford
Tradename: See Section 3

Callen Mfg. Corp.* **
1425 N. First Ave.
Maywood, Ill.
Metals: D
Facilities: 1, 2, 5
Trademark: See Section 3

Camp Aircraft Parts, Inc.
1133-39 McCarter Hwy.
Newark 2, N. J.
Metals: A, D
Facilities: 1, 2, 5
Tradename: CAP

John J. Carey Co.
2194-96 Bridge St.
Philadelphia 24, Pa.
Metals: D
Facilities: 1, 2, 5
Trademark: See Section 3

Carpenter Die Casting Co. Ltd.
474 Burlington St., E.
Hamilton, Ont., Canada
Metals: A, D, E, F
Facilities: 1, 2, 3, 5
Trademark: See Section 3

J. I. Case Co.
Magneto Div.
S. Independence Ave.
Rockford, Ill.
Metals: A
Facilities: 1, 4, 5, 6

Casper's Machine Shop
1047 77th Ave.
Oakland, Cal.
Metals: D
Facilities: 1, 2, 5

Central Casting Co.
400-416 Trumbull
Elizabeth, N. J.
Metals: A, D
Facilities: 1, 2, 3, 4, 5, 6

Central Die Casting & Mfg. Co., Inc.* **
2935 W. 47 St.
Chicago 32, Ill.
Metals: A, D
Facilities: 1, 2, 5
Trademark: See Section 3

Central Pattern Co.
134-36 So. Front St.
Quincy, Ill.
Metals: A, D
Facilities: 2

Century Die Casting Co.*
2629 W. Fletcher
Chicago 18, Ill.
Metals: A, D
Facilities: 2
Trademark: See Section 3

Challenger Lock Co., Inc.
4865 Exposition Blvd.
Los Angeles 16, Calif.
Metals: A, D
Facilities: 1, 2, 3, 5, 6

W. L. Chapman Co., Inc.
2886 E. Walnut
Pasadena 8, Cal.
Metals: A, B
Facilities: 2, 5

Char-Lynn Co.*
2843 26th Avenue, S.
Minneapolis 6, Minn.
Metals: A
Facilities: 1, 2, 5
Trademark: See Section 3

Chautauqua Hardware Corp.
31 Water
Jamestown, N. Y.
Metals: A, D
Facilities: 1, 2, 3, 4, 5, 6

Chicago Die Casting Mfg. Co.
2510 W. Monroe
Chicago 12, Ill.
Metals: D
Facilities: 1, 2, 5, 6

Chicago Expansion Bolt Co.
1338 W. Concord Pl.
Chicago 22, Ill.
Metals: E
Facilities: 1, 2, 5

Chicago White Metal Casting, Inc.* **
5239 W. Grand Ave.
Chicago 39, Ill.
Metals: A, D
Facilities: 2, 3, 4, 5, 6
Tradename: CWM
Trademark: See Section 3
Representatives: *Indianapolis, Ind.*, W. A. Dentel, 3728 Manor Ct.; *Shaker Heights, Ohio*, A. L. Gordon, 2525 Kemper Rd.; *Chicago, Ill.*, S. Gregory, Wm. Keane, 7101 S. Stoney Island, F. Kruchten, 9633 S. Dobson Ave., N. Levinson, 2944 W. Chase Ave.; *Indianapolis, Ind.*, H. M. Oshry, R. H. Thielker, 3728 Manor Ct.; *Chicago, Ill.*, R. N. Provost, 15 S. Austin Blvd.

Cincinnati Die Casting Co., The* **
2117 Spring Grove Ave.
Cincinnati 14, O.
Metals: A, B, D
Facilities: 1, 2, 3, 5
Tradename: CINDIE
Trademark: See Section 3

Clinton Machine Co.
Die Cast Div.
Clinton, Mich.
Metals: A, D
Facilities: 1, 2, 5
Trademark: See Section 3

Clyde Equipment Co.
3816 McDonald
St. Louis 16, Mo.
Metals: D
Facilities: 1, 2, 3, 5, 6
Trademark: See Section 3

Coast Die Casting Co.*
5752 Joanne Place
Culver City, California
Metals: A, D
Facilities: 2, 5
Trademark: See Section 3

Colbert Die Cast Co.
5416 Tweedy Blvd.
South Gate, Cal.
Metals: A, D
Facilities: 1, 2, 5, 6

Comet Metal Products Co., Inc.
132 Street & 91st Ave.
Richmond Hill 18, N. Y.
Metals: D, E, F
Facilities: 1, 2, 5, 6
Trademark: See Section 3

Columbia Metal Products Inc.
Box 544
Columbia, Tenn.
Metals: A
Facilities: 2

Conetta Tool & Die Co., Inc.
73 Sunnyside Ave.
Samford Conn.
Metals: D
Facilities: 1, 2, 5

Congdon Die Casting Co.
1266 Godfrey Ave., S.W.
Grand Rapids, Mich.
Metals: D
Facilities: 1, 2, 5

Conneaut Die Casting* **
618 Sandusky
Conneaut, O.
Metals: A, D
Facilities: 1, 2, 3, 4, 5, 6
Trademark: See Section 3

Consolidated Die Cast Corporation of America
Dowagiac, Mich.
Metals: A, D
Facilities: 1, 2, 3, 5, 6
Trademark: See Section 3

Continental Die Casting Corp.* **
9615 Grinnell Ave.
Detroit 13, Mich.
Metals: D
Facilities: 1, 2, 3, 5, 6
Trademark: See Section 3

Continental Metallifacture Co.
414 Pine St.
Scranton, Pa.
Metals: A, D
Facilities: 1, 5
Tradename: CMC

Robert A. Cox Die Casting Co.*
11418 Knightsbridge Ave.
Culver City, Cal.
Metals: A
Trademark: See Section 3

Crown City Die Casting Co.
84 N. Fulton Ave.
Pasadena 8, Calif.
Metals: A, D
Facilities: 1, 2, 5
Trademark: See Section 3

Dallas Die-Casting Co.
316 Rock Island St.
Dallas 7, Tex.
Metals: A, D
Facilities: 1, 2, 3, 5, 6

Danacor Co.
430 Carroll
Brooklyn 15, N. Y.
Metals: D
Facilities: 1, 2, 5

Edward W. Daniel Co.
4050 St. Clair Ave.
Cleveland 3, O.
Metals: D
Facilities: 1, 5, 6
Trademark: See Section 3

Darmon Tool & Mfg. Corp.
2664 Park Ave.
New York, N. Y.
Metals: D
Facilities: 1, 2, 5, 6

Dayton Die Casting Co.
111 Front
Dayton 2, O.
Metals: A, D, E

Dearborn Diecasting & Cavity Co.
199 Vinewood Ave.
Detroit 16, Mich.
Metals: D
Facilities: 1, 2, 5
1806 N. Keeler Ave.

DeCardy Bros. Co.* **
Chicago 39, Ill.
Metals: D, E
Facilities: 2, 5

DeLaval Separator Co.
25 Columbia
Poughkeepsie, N. Y.
Metals: D
Facilities: 1, 4, 5, 6
Trademark: See Section 3

Delta Die Casting Corp.*
9393 W. Seymour Ave.
Schiller Park, Ill.
Metals: A
Facilities: 2, 4, 5
Trademark: See Section 3

Denham Mfg. Co.
Pere Marquette St.
Big Rapids, Mich.
Metals: D
Facilities: 1, 2, 3, 4, 5, 6
Trademark: See Section 3

DeRoy Mfg. Co.
9208 Atlantic Ave.
South Gate, Cal.
Metals: D
Facilities: 1, 2, 5

Detroit Die Casting Corp.* **
597 Beaufait Ave.
Detroit 7, Mich.
Metals: D
Facilities: 3
Trademark: See Section 3

Detroit Ice Machine Co.
2615 12th St.

Detroit 16, Mich.
Metals: A
Facilities: 5
Tradename: DIMCO

Dialoy, Inc.
214 S. Clinton
Chicago 6, Ill.
Metals: A, D
Facilities: 2, 5
Tradename: DIALOY

Die Cast Products, Inc.
4040 Hough Ave.
Cleveland 3, O.
Metals: A, D, E
Facilities: 1, 5

Die Cast Products, Inc.* **
621 W. Rosecrans Ave.
Gardena, Cal.
Metals: A, D
Facilities: 1, 2, 5
Trademark: See Section 3

Die Casting Corp. of Florida
3000 N. W. 75
Miami 47, Fla.
Metals: A, D
Facilities: 2

Diecasters, Inc.
720 Grand Ave.
Ridgefield, N. J.
Metals: A, D
Facilities: 1, 2, 5, 6
Tradename: FM Products
Trademark: See Section 3

Dieco Die Casting Corp.
59-27 Decatur
Brooklyn 27, N. Y.
Metals: D
Facilities: 1, 2, 5
Trademark: See Section 3

J. E. Dietz Mfg. Co.
9216 Bermudez
Rivera, Cal.
Metals: D
Facilities: 2, 5

Dixie Die Casting Corp.
Box 1208
Reidsville, N. C.
Metals: A
Facilities: 2, 4, 5
Trademark: See Section 3

Dollin Corp.* **
600 S. 21st.
Irvington 11, N. J.
Metals: A, D
Facilities: 1, 2, 3, 5, 6
Trademark: See Section 3
Representatives: *St. Louis, Mo.*, Emmett T. Bergmann, 3910 Lindell Blvd.; *Denville, N. J.*, Edward R. Broderick, 140 Rainbow Trail; *Canton, Ohio*, Albert H. Dervin, 217-18th St., N.W.; *Flushing, N. Y.*, T. R. Foley, 32-32 161st St.; *Detroit, Mich.*, J. L. Fralick, 18040 James Couzens Highway; *Louisville, Ky.*, Marvin C. Greer, 3620 Lexington Rd.; *St. Paul, Minn.*, A. A. Gustafson, 161 Griggs-Midway Bldg.; *Chicago, Ill.*, Hember & Associates, Inc., 1554 Howard St.; *Boston, Mass.*, B. F. Jaques, 67 Batterymarch St.; *Buffalo, N. Y.*, Robert C. Kleindinst, P. O. Box 18; *Hershey, Pa.*, Edward A. Linhart, P. O. Box 366; *Memphis, Tenn.*, L. E. Offutt Co., Inc., 431 N. Dunlap St.; *Charlotte, N. C.*, G. S. Patton & Assoc., Municipal Airport Terminal; *Bayside, Long Island, N. Y.*, J. R. Schuchardt, 45-46 220th St.; *Glenside, Pa.*, John M. Sullivan, 732 Hillcrest Ave.

Dominion Die Casting Ltd.
Heinz St.
Wallaceburg, Ont., Canada
Metals: A, D
Facilities: 1, 2, 5
Trademark: See Section 3

Dow Chemical Co., The*
Magnesium Die Casting Sales
Midland, Mich.
Metals: A, C
Facilities: 1, 2, 3, 5, 6
Trademark: See Section 3

Dowst Manufacturing Co.
600 No. Pulaski Rd.
Chicago 24, Ill.
Metals: D
Facilities: 1, 2, 3, 6
Tradename: Shure-Cast

Duane Specialties, Ltd.
209 Parkhurst
Newark 5, N. J.
Metals: D
Facilities: 1, 2, 5
Tradename: Duane
Trademark: See Section 3

DuPage Die Casting & Fabricating Co., Inc.
8049 N. Ridgeway Ave.
Skokie, Ill.
Metals: A, D
Facilities: 2, 5
Trademark: See Section 3

Du-Wel Metal Products, Inc.* **
P. O. Box 307
Bangor, Mich.
Metals: A, D
Facilities: 1, 2, 3, 5, 6
Trademark: See Section 3

Dynamic Die Casting Co.
510 W. Ten Mile Rd.
Madison Heights, Mich.
Metals: D
Facilities: 1, 5, 6
Tradename: D.D.C.

E. B. Metal Products Co., Inc.
12-12 Bridge Plaza, S.
Long Island City 1, N. Y.
Metals: D
Facilities: 1, 2, 5

Eastern Malleable Iron Co.
Eastern Casting Corp. Div.
64 S. William St.
Newburgh, N. Y.
Metals: A
Facilities: 1, 2, 4, 5, 6
Trademark: See Section 3
Representatives: *Newburgh, N. Y.*, W. M. Adams, E. D. Word, Eastern Casting Corp.; *Union, N. J.*, Talbot Associates Inc., Morris Ave.; *Naugatuk, Conn.*, Eastern Malleable Iron Co.; *Cleveland, Ohio*, Eberhard Mfg. Co. Div.; *Syracuse, N. Y.*, Frazer & Jones Div.; *Wilmington, Delaware*, Eastern Malleable Iron Co.

R. H. Eggers Co.
4701 Perkins Ave.
Cleveland 3, O.
Metals: A
Facilities: 1, 5, 6

Enhorning Industries
2013 W. 69
Chicago 36, Ill.
Metals: D
Facilities: 1, 2, 5

Ehrhart Die Casting Co.
K.O.K.X. Road
Hamilton, Ill.
Metals: D
Facilities: 1, 3, 5, 6

Eklind Tool & Mfg. Co.
2627 N. Western Ave.
Chicago 47, Ill.
Metals: D
Facilities: 1, 2, 5, 6

El Cajon Die Casting & Mfg. Co.
590 Marshall Ave.
El Cajon, Cal.
Metals: D
Facilities: 1, 2, 5

Electric Auto-Lite Co., The
Lamp Div.
Cincinnati 15, O.
Metals: A, B, D
Facilities: 1, 2, 3, 4, 5, 6
Tradename: Auto-Lite
Trademark: See Section 3

Electric Auto-Lite Co., The
Woodstock Div.
501 Clay Street
Woodstock, Ill.
Metals: A, D
Facilities: 1, 2, 3, 4, 5, 6
Tradename: Auto-Lite
Trademark: See Section 3

El Monte Tool & Die Casting, Inc.* **
2425 N. Tyler Ave.
El Monte, Cal.
Metals: A, D
Facilities: 2, 5
Trademark: See Section 3

Empire Die Casting Co.
19800 Miles Ave.
Cleveland 28, O.
Metals: A
Facilities: 2, 5
Tradename: Empire
Trademark: See Section 3

Engineering Cast Products
17601 Swift
Detroit 3, Mich.
Metals: A, D
Tradename: Plaster Process

Engineers Tool & Mfg. Co., Inc.* **
7 Island Brook Avenue
Bridgeport 6, Connecticut
Metals: D
Facilities: 2, 5

Ertl Co., The
2475 Ertl Lane
Dubuque, Ia.
Metals: A, D
Facilities: 1, 5, 6

Exact Tool & Die Co.
5829 Tireman Ave.
Detroit 4, Mich.
Metals: A
Facilities: 1, 2, 5
Trademark: See Section 3

Excel Products Co., Inc.
Codwise Ave. & Elizabeth St.
New Brunswick, N. J.
Metals: D
Facilities: 1, 2, 5, 6

Falconer Metal Specialty Co., Inc.* **
Fairmont Ave.
Lakewood, N. Y.
Metals: A, D
Facilities: 1, 2, 3, 5, 6
Trademark: See Section 3

Fall River Tool & Die Co.
4 Walker St.
Fall River, Mass.
Metals: A, D
Facilities 1, 2, 4, 5

Fanarc Mfg. Co., Inc.*
1115 W. Whittier Blvd.
Whittier, Calif.
Metals: A, D
Facilities: 1, 2, 6
Tradename: Fanarc

Federal Die Casting Co.* **
2220 Elston Ave.
Chicago 14, Ill.
Metals: A, D
Facilities: 1, 2, 4, 5, 6
Trademark: See Section 3

Finkel Umbrella Frame Co., Inc.
200 Brush Ave.
Bronx 65, N. Y.
Metals: D
Facilities: 1, 2, 5, 6

Fisk Products Inc.
207 N. Main St.
Berrien Springs, Mich.
Metals: D
Facilities: 2, 5

Form-A Die Casting Corp.
100 Felton Street
Waltham 54, Mass.
Metals: A, D
Facilities: 2, 5

Forster-Appelt Mfg. Co., Inc.
82 E. Lanark Ave.
Lanark, Ill.
Metals: A, D, E
Facilities: 1, 2, 5
Tradename: Forster

Fort Die Casting Corp.
2409 Wills St.
Marysville, Mich.
Metals: A, D, E
Facilities: 1, 2, 3, 5, 6
Tradename: Fort
Trademark: See Section 3

Fort Worth Die Casting Co., Inc.
1213 E. Daggett
Ft. Worth, Texas
Metals: A, D
Facilities: 1, 3
Tradename: Big Boy Ft. Worth, Tex.
Trademark: See Section 3

Frantz Mfg. Co.
1200 Camden Ave., S.W.
Canton 6, O.
Metals: A, D
Facilities: 1, 2, 5, 6
Trademark: See Section 3

Future Products Co.
3625 N. Mississippi Ave.
Portland 12, Ore.
Metals: D
Facilities: 1, 2
Tradename: FPC
Trademark: See Section 3

Gasket, Packing & Specialty Co., Inc.
41 N. Saxon Ave.
Bay Shore, N. Y.
Metals: E, F
Facilities: 1, 2, 5, 6

Gemco Mfg. Co.
501 S. Lipan
Denver 23, Colo.
Metals: A, D
Facilities: 1, 2, 5

General Cast Products, Inc.
2211 Waverly Street, Swissvale
Pittsburgh 18, Pa.
Metals: D
Facilities: 2

General Die Casting Co.
1956 Burdette St.
Ferndale 20, Mich.
Metals: D
Facilities: 1, 2, 3, 5, 6
Trademark: See Section 3

General Electroplating Co.
601 Russell Ave.
Indianapolis 25, Ind.
Metals: D
Facilities: 1, 3, 5, 6

General Metals Corp.
444 S. Ninth Ave.
Mt. Vernon, N. Y.
Metals: D
Facilities: 1, 2, 3, 6

General Motors Corp.
AC Spark Plug Div.
1300 N. Dort Highway
Flint 2, Mich.
Metals: A, C, D
Facilities: 1, 2, 3, 4, 5, 6
Trademark: See Section 3

General Motors Corp.
Fabricast Div.
P. O. Box 211
Malvern, Ark.
Metals: A
Facilities: 2, 4
Tradename: FABRICAST
Trademark: See Section 3

General Motors Corp.
Fabricast Div.
P. O. Box 271
Bedford, Ind.
Metals: A
Facilities: 2, 4
Tradename: FABRICAST
Trademark: See Section 3

Gibbs Automatic Moulding Corp.
1106 5th Street
Henderson, Ky.
Metals: A, D
Facilities: 1, 2, 3, 5, 6
Trademark: See Section 3
Representatives: *Henderson, Ky.*, W. J. Chovanec, 1106 5th Street; *Birmingham, Mich.*, L. R. Mattice, 31700 Nixon Rd.; *Evansville, Ind.*, S. L. Nicholson, P. O. Box 1062, Sta. C.

Gordon Mfg. Co. Ltd.
1390 Wallace
Wallaceburg, Ont., Canada
Metals: A
Tradename: PERMOLD

Gorton & MacIntyre
55 South Third Ave.
Mount Vernon, N. Y.
Metals: D
Facilities: 1

Grand Die Casting, Inc.*
7936 W. Grand Ave.
Elmwood Park 35, Ill.
Metals: A, D
Facilities: 1, 2, 5
Trademark: See Section 3

Grand Rapids Brass Co.
Div. of Crampton Mfg. Co.
420 50th St., S. W.
Grand Rapids 8, Mich.
Metals: D
Facilities: 1, 3, 5, 6
Trademark: See Section 3

Grand Rapids Die Casting Co.
2125 Turner Rd., N. W.
Grand Rapids 4, Mich.
Metals: D
Facilities: 1, 2, 3, 5, 6
Trademark: See Section 3

Grand Steel & Mfg. Co.
1400 W. 14 Mile Rd.
Clawson, Mich.
Metals: A, D
Facilities: 1, 3, 5
Trademark: See Section 3

Great American Plastics Co.
Factory St.
Nashua, N. H.
Metals: D
Facilities: 1, 2, 5, 6
Tradename: Irwin
Trademark: See Section 3

C. M. Grey Industries Inc.* **
358 Central Ave.
East Orange, N. J.
Metals: A, D, E, F
Facilities: 2, 5
Trademark: See Section 3

Gries Reproducer Corp.* **
140 Beechwood Ave.
New Rochelle, N. Y.
Metals: D
Facilities: 1, 2, 3, 4, 5
Tradename: Intercast
Trademark: See Section 3
Representatives: *Los Angeles, Cal.*, Hargrove-Green Co., 5429 Alhambra Ave.; *Chicago, Ill.*, Jay C. Angel & Co., 2743 W. Peterson Ave.; *Westwood, Mass.*, G. W. Byron, 77 Greenhill Rd.; *Excelsior, Minn.*, A. R. Compton, P. O. Box 425; *Shaker Heights, O.*, H. F. Davis & Sons, 3262 Warrington Rd.; *Milwaukee, Wis.*, Clarence W. Binzel, 305 Century Bldg.; *Atlanta, Ga.*, South East Atlantic Co., 2443 N. Amanda Circle NE; *Manhassett, N. Y.*, B. L. Rosenthal, Inc., 15 Colonial Parkway; *Flushing, N. Y.*, Jack Makler, 73-17 164th St.; *Webster Groves, Mo.*, Components & Equipment Co., 501 Clark Ave.; *Habana, Cuba*, Jose Rodriguez Roldan, Apartado (P. O. Box) 3317.

H & M Industries, Inc.
26810 Telegraph Rd.
Flat Rock, Mich.
Metals: A, C, D
Facilities: 1, 2, 3, 4, 5, 6
Trademark: See Section 3

H & S Metal Products Co.
4159 Whiteside St.
Los Angeles, Calif.
Metals: A, C
Facilities: 2, 4, 5

Hadlock & Temte, Inc.
P. O. Box 405
Winfield, Ill.
Metals: D
Facilities: 2, 5
Trademark: See Section 3

Halex Die Casting Co.
8640 Bessemer Ave.
Cleveland 27, O.
Metals: A, D
Facilities: 1, 2, 5
Tradename: Halex
Trademark: See Section 3

C. M. Hall Lamp Co.
1035 E. Hancock Ave.
Detroit 7, Mich.
Metals: D
Facilities: 1, 3, 5, 6

Hall Level & Mfg. Wks.
1119 E. 4th St., P. O. Box 1101
Austin, Texas
Metals: A, D
Facilities: 1, 5, 6
Tradename: Hall Level

Hamilton Diecasting Corp.*
2020 Jericho Turnpike
New Hyde Park, N. Y.
Metals: A, D
Facilities: 1, 2, 5
Trademark: See Section 3

Hamilton Die Cast Inc.
240 North "B" St.
Hamilton, Ohio
Metals: A, D
Facilities: 1, 2, 3, 4, 5, 6
Trademark: See Section 3

Hamlin Products, Inc.
7600 Asher Ave., P. O. Box 2016
Little Rock, Ark.
Metals: A
Facilities: 1, 2, 4, 5, 6
Trademark: See Section 3

Hampden Brass & Aluminum Co.
262 Liberty St.
Springfield 1, Mass.
Metals: A, D
Facilities: 2, 4, 5
Tradename: Hampden
Trademark: See Section 3

Harbot Die Casting Corp.*
52 E. Centre
Nutley 10, N. J.
Metals: A
Facilities: 1, 2, 5

Hardy Mfg. Corp.
Sub. of Sheller Mfg. Corp.
Union City, Ind.
Metals: D
Facilities: 1, 2, 3, 5, 6

Harvey Aluminum
19200 S. Western Ave.
Torrance, Calif.
Metals: A
Facilities: 1, 2, 3, 4, 5, 6

Harvill Corp.* **
6251 W. Century Blvd.
Los Angeles 45, Cal.
Metals: A, B, C, D
Facilities: 1, 2, 5
Trademark: See Section 3

Haug Die Casting Corp.
52 Brown Ave.
Springfield, N. J.
Metals: D
Facilities: 1, 2, 3, 5, 6

Hayden Mfg. Co.
173 N. Peoria
Chicago, Ill.
Metals: D
Facilities: 1, 2, 3, 4, 5, 6

Heick Die Casting Corp.* **
6550 W. Diversey Ave.
Chicago 35, Ill.
Metals: A, D
Facilities: 1, 2, 5
Trademark: See Section 3

Helfrich Die Casting Co.
208 Schneider Rd.
North Canton, O.
Metals: D
Facilities: 1, 2, 5
Trademark: See Section 3

Helm Accessories, Inc.
8820 Grinnell
Detroit 13, Mich.
Metals: D
Facilities: 1, 5

Hermel Die Casting Corp.
P. O. Box 155
Eau Claire, Mich.
Metals: A, D
Facilities: 1, 2, 5

Hilfinger Corp.* **
1800 Westwood Ave.
Toledo 7, O.
Metals: D
Facilities: 1, 2, 3, 5, 6
Trademark: See Section 3

Holland Die Casting Co., Inc.
582 Gordon
Holland, Mich.
Metals: D
Facilities: 1, 3, 5, 6
Trademark: See Section 3

Hooper Die Casting
300 Maple Ave.
Trenton 8, N. J.
Metals: D, E
Facilities: 2

Hoover Co., The* **
Die Casting Div.
North Canton, O.
Metals: A, D
Facilities: 2, 5
Tradename: Hoover
Trademark: See Section 3
Representatives: *Royal Oak, Mich.*, Earl M. Hovey, 4346 N. Woodward Ave. (Detroit Area); *North Canton*, O., C. R. Nelius, c/o The Hoover Co. (Midwest); E. R. Speicher, c/o The Hoover Co. (East).

Hoover Ball & Bearing Co.
Universal Die Casting Div.
Saline, Mich.

Utilex Div.
Fowler, Mich.

Glenvale Products Div.
Malvern, Ark.

Adrian Division
Adrian, Mich.
Metals: A, D
Facilities: 1, 2, 3, 4, 5, 6

Hudson Valley Aluminum Co., Inc.
Box 506
Newburgh, N. Y.
Metals: A
Facilities: 1, 2, 5

R. W. Hughes Industries, Inc.
2713 Ludelle
Ft. Worth, Tex.
Metals: A, D
Facilities: 1, 2, 4, 5

Hurd Lock & Mfg. Co.
Almont Division
Almont, Michigan
Metals: D
Facilities: 1, 2, 3, 5, 6
Tradename: Hurd
Trademark: See Section 3

Ideal Toy Corp.
184-10 Jamaica Ave.
Hollis, N. Y.
Metals: D

Illinois Advance Die & Mold Co.
2005 N. Major Ave.
Chicago 39, Ill.
Metals: A, D
Facilities: 1, 2, 5

Illinois Lock Co., The
819 S. Ada
Chicago 7, Ill.
Metals: D
Facilities: 1, 2, 3, 5

Imperial Die Casting Corp.
11411 Knightsbridge Ave.
Culver City, Calif.
Metals: A
Facilities: 1, 2, 5, 6

Indiana Steel Products Co., The
Valparaiso, Ind.
Metals: A (Alnico Magnet housings only)
Facilities: 1, 2, 4, 5, 6
Tradename: "Hyflux" Alnico Permanent Magnets

Industrial Die Cast & Mfg. Co., Inc.
2980 N.W. 22nd St.
Miami, Fla.
Metals: A, D
Facilities: 2
Tradename: "IDCO"

Industrial Die Casting Co.
2300 N. Lister Ave.
Chicago 14, Ill.
Metals: A
Facilities: 1, 2, 4, 5, 6
Trademark: See Section 3

Inland Die Casting Co., Inc.
8141 N. Lawndale
Skokie, Ill.
Metals: A
Facilities: 1, 2

Irrigation Equipment Co., Inc.
1300 Bethel Dr.
Eugene, Oregon
Metals: A, B, C, D
Facilities: 1, 2, 3, 4, 5, 6
Tradename: IRECO
Trademark: See Section 3

Irvington Die Casting Co.
133 S. 20 St.
Irvington, N. J.
Metals: A, D

J & F Tool & Die Casting Corp.
P. O. Box 175
Athens, Pa.
Metals: D
Facilities: 1, 2, 5

Jersey Plastic & Die Casting Co.* **
149 Shaw Ave.
Irvington 11, N. J.
Metals: A, D
Facilities: 1, 2, 5, 6

Jervis Corp.
Grandville, Mich.
Metals: A, D
Facilities: 1, 2, 3, 4, 5, 6
Trademark: See Section 3

Jet Die Casting Corp.* **
1317 W. Concord Place
Chicago 22, Illinois
Metals: A, D
Facilities: 2, 5

Kadee Metal Products Co.
720 S. Grape
Medford, Ore.
Metals: A, D, E
Facilities: 1, 2, 4, 5, 6
Tradename: KADEE
Trademark: See Section 3

Kalamazoo Die Casting Co.
Mastenbrook Dr. & Milham Rd.
Kalamazoo, Mich.
Metals: A, D
Facilities: 2, 5
Trademark: See Section 3

Kaljer Mfg. Co. Div. of Jervis Corp.
Middleville, Mich.
Metals: A
Facilities: 1, 5
Trademark: See Section 3

Kamin Die Casting & Mfg. Co.*
3315 N. Knox Ave.
Chicago 41, Ill.
Metals: A, D
Facilities: 2, 5
Trademark: See Section 3

Ken-Moore Die Cast
12299 Woodbine
Detroit, Mich.
Metals: D
Facilities: 1, 2, 3, 5, 6
Tradename: K. M.

Kennedy Die Castings, Inc.
200 Harding St.
Worcester 4, Mass.
Metals: A, D
Facilities: 1, 5

Mark Kenny Products Co., Inc.
251 E. 137 St.
New York 51, N. Y.
Metals: D
Facilities: 1, 2, 5

Kent Castings Corp.
200 Garden St., S.E.
Grand Rapids, Mich.
Metals: D
Facilities: 1, 2, 3, 4, 5, 6
Tradename: Kencast
Trademark: See Section 3

Kiowa Corp.* **
1200 E. May St.
Marshalltown, Ia.
Metals: A, D
Facilities: 1, 2, 5
Trademark: See Section 3

Kiser Plating Co., Inc.
P. O. Box 904
401 East Howard St.
Muncie, Indiana
Metals: A, D
Facilities: 1, 3, 5, 6
Tradename: Kov Kiser

Kisiel Die Casting Works
127 Otis St.
Batavia, N. Y.
Metals: A, D, E
Facilities: 1, 2, 5

Kitchen-Quip, Inc.
E. Marion Street
Waterloo, Ind.
Metals: A
Facilities: 1, 2, 3, 5

Kolsters Tool & Die Co.
8451 Baldwin St.
Oakland, Calif.
Metals: A, D, E, F
Facilities: 1, 2, 5

Paul Krone Die Casting Co.* **
1811 N. Kostner Ave.
Chicago 39, Ill.
Metals: A, D
Facilities: 2, 5
Trademark: See Section 3

Kuhlman Diecasting Co.
7300 East 17th St.
Kansas City 26, Mo.
Metals: A, D
Facilities: 1, 2, 3, 5, 6
Tradename: KD
Trademark: See Section 3

Kwikset Locks, Inc.
516 E. Santa Ana
Anaheim, Cal.
Metals: A, D
Facilities: 1, 2, 3, 5, 6
Tradename: Kwikset
Trademark: See Section 3

Laboratory Equipment Corp.
Hilltop Rd., P. O. Box 151
St. Joseph, Mich.

Metals: D
Facilities: 1, 2, 3, 5, 6
Tradename: Leco
Trademark: See Section 3

Laco Die Casting Co.
23440 Lakeland Blvd.
Euclid 23, Ohio
Metals: D
Facilities: 5

La France Precision Casting Co.
29th & McKean Sts.
Philadelphia 45, Pa.
Metals: D
Facilities: 1, 2, 3, 5, 6

Lake Center Switch Co.
51 Johnson
Winona, Minn.
Metals: D
Facilities: 1, 2, 5, 6

Lakeshore Die Casting Ltd.
482 Queen Elizabeth Way
Oakville, Ont., Canada
Metals: A, D
Facilities: 1, 2, 5
Tradename: LAKESHORE
Trademark: See Section 3

Lansco Die Casting Co.* **
2029 N. Chico Ave.
El Monte, Cal.
Metals: A, D
Facilities: 1, 2, 5

Latrobe Die Casting Co.*
Unity St.
Latrobe, Pa.
Metals: A, D, E, F
Facilities: 2, 5
Trademark: See Section 3

Leco Plating Co.
Hilltop Rd.
St. Joseph, Mich.
Metals: D
Facilities: 1, 2, 3, 4, 5, 6
Tradename: Leco
Trademark: See Section 3

Lee Silver Service, Inc.
13561 Helen
Detroit, Mich.
Metals: D
Facilities: 1, 2, 3, 5, 6
Trademark: See Section 3

Lester Castings, Inc.*
25661 Cannon Rd.
Bedford Heights, O.
Metals: A, C, D
Facilities: 2
Trademark: See Section 3

Ray Lewis & Son, Inc.
Delaware Rd.
Marysville, Ohio
Metals: D
Facilities: 1, 2, 3, 4, 5

Lincoln Die Casting, Inc.
20805 Mound Rd.
Van Dyke, Mich.
Metals: D
Facilities: 5
Trademark: See Section 3

Litemetal Dicast, Inc.*
1927 Wildwood Ave.
Jackson, Mich.
Metals: A, C
Facilities: 2, 5
Trademark: See Section 3
Representatives: *Detroit, Mich.*, F. E. Wickham Co., 19451 James Couzens; *Evanston, Ill.*, G. A. Wagner, 615 Sheridan Rd.; *Norwalk, Conn.*, Light Metal Assoc's., 25 Belden Ave.; *Wauwatosa, Wis.*, N. W. Snashall, 1306 N. 63rd. Ct.; *Wayne, Pa.*, E. M. Sawyer, Box 44; *St. Paul, Minn.*, L. C. Newton, Inc., 2295 University Ave.

Little Giant Pump Co.
5101 Classen Blvd.
Box 9545
Oklahoma City 18, Oklahoma
Metals: A
Facilities: 1, 5, 6

Littler Diecast Corp.
P. O. Box 351, State Rd. 67
Albany, Ind.
Metals: A
Facilities: 2
Trademark: See Section 3

Lloyd Products, Inc.* **
1837 University Ave.
St. Paul 4, Minn.
Metals: A, D
Facilities: 1, 2, 5, 6
Trademark: See Section 3

Logan Industries, Inc.
1640 W. Carroll Ave.
Chicago 12, Ill.
Metals: D
Facilities: 2, 3, 5

Long Island Die Casting, Inc.
21 Smith
Inwood 96, L. I., N. Y.
Metals: D
Facilities: 1, 2, 5

Los Angeles Die Casting Co.* **
340 Crocker
Los Angeles 13, Cal.
Metals: A, B, D
Facilities: 1, 2, 5
Trademark: See Section 3

Ludman Corp.
14100 Biscayne Blvd.
North Miami, Fla.
Metals: A, D
Facilities: 1, 2, 4, 6

Lyons Diecasting Co.
Buckner, Mo.
Metals: D
Facilities: 1, 2, 5, 6
Trademark: See Section 3

**Madison-Kipp Corp.* **
213 Waubesa
Madison, Wis.
Metals: A, D
Facilities: 1, 2, 4, 5
Tradename: KIPP
Trademark: See Section 3

Magnesium Industries, Inc.
1313 Kalamazoo
South Haven, Mich.
Metals: A, B, C
Facilities: 2, 5, 6
Tradename: Magind
Trademark: See Section 3

Manger Die Casting Co., Inc.
1 Maple
Shelton, Conn.
Metals: A, D
Facilities: 1, 2, 3, 4, 5, 6
Trademark: See Section 3

Manor Die Cast Corp.*
P. O. Box 386
Bedford, O.
Metals: A
Facilities: 2
Trademark: See Section 3

Jos. P. Manz Die Casting Co.
550 W. Beach Ave.
Inglewood 3, Cal.
Metals: A
Facilities: 2

Marco Industries, Inc.
3rd & Franklin Streets
Womelsdorf, Pennsylvania
Metals: A
Facilities: 1, 4, 6

L. E. Mason Co.*
98 Business St.
Boston 36, Mass.
Metals: A, D
Facilities: 1, 2, 3, 5
Trademark: See Section 3

Master Fabricators, Inc.
6 Brooklyn Ave.
Massapequa, N. Y.
Metals: A, D
Facilities: 2, 4, 5

Mendler Mfg. Co.
P. O. Box 125, Sandwich Postal Station
Windsor, Ont., Canada
Metals: A, D, E
Facilities: 1, 2, 5, 6

Meta-Mold Aluminum Co.*
Sub. of The Dayton Malleable Iron Co.
Cedarburg, Wis.
Metals: A, C
Facilities: 2, 4, 5
Tradename: Meta-Mold

Metal-Cast Co.
620 16th Ave., W.
Birmingham, Ala.
Metals: A, D
Facilities: 1, 2, 5, 6

Metal-X Specialties Co., Inc.
5 E. Third
New York 3, N. Y.
Metals: A, D, E
Facilities: 1, 2, 5
Tradename: Metal-X

Metro Casting Co., Inc.
47 Grattan Street
Brooklyn 37, N. Y.
Metals: D
Facilities: 1, 2, 5
Tradename: Metro
Trademark: See Section 3

Micro-Products Engineering Co.
230 Ridgewood Ave.
Newark 8, N. J.
Metals: D
Facilities: 1, 2, 3, 4, 5, 6

Midwest Die Casting Co.* **
3930 N. First
Milwaukee 12, Wis.
Metals: D
Facilities: 2
Trademark: See Section 3

Mid-State Die Casting Co.
7878 S. Division Ave.
Grand Rapids 8, Mich.
Metals: D
Facilities: 5

Mid-Western Die Casting Co.
1501 N. Halsted Street
Chicago 22, Ill.
Metals: A, D
Facilities: 2, 5
Trademark: See Section 3

**Milwaukee Die Casting Co.* **
4132 N. Holton
Milwaukee 12, Wis.
Metals: A, D, E, F
Facilities: 2, 5
Trademark: See Section 3

Missouri Diecasting Co.*
1411 N. 17 St.
St. Louis 6, Mo.
Metals: A, D
Facilities: 1, 2, 5
Trademark: See Section 3

Modern Die Casting Corp.*
5419 N. Kedzie Ave.
Chicago 25, Ill.
Metals: A, D
Facilities: 2, 5

Mohawk Die Casting Co.
Sub. of Mohawk Foundries, Inc.
55 First St.
Berea, Ohio
Metals: A
Facilities: 2, 4, 5

Molded Products Co. Inc.
2820 N. Sylvania, Box 7281
Ft. Worth, Texas
Metals: A, D, E
Facilities: 1, 2, 5, 6

**Monarch Aluminum Mfg. Co.* **
9205 Detroit Ave.
Cleveland 2, O.
Metals: A, D
Facilities: 1, 2, 4, 5, 6

Tradename: MONARCAST, VELVAGLAZE, SPECTRA-GLAZE
Trademark: See Section 3
Representatives: *Cincinnati, Ohio,* R. Gray, 2088 W. Miles Rd.; Boonton, N. J., Manley Hutchinson, 17 Derrygally Circle R. D. #2; *Chicago Ill.,* G. MaRugg, 5349 Fletcher St.; *Westlake, Ohio,* Joseph Shrier, 2441 Elmwood Dr.; *Rochester, N. Y.,* Gerald Liebel, 432 Browncroft Blvd.

Monarch Die Casting Corp.
1642 20th St.
Santa Monica, Cal.
Metals: A, D
Facilities: 1, 2, 5

Monarch Governor Co.
2800 Tyler Rd.
Willow Run, Mich.
Metals: D
Facilities: 1, 2, 5
Trademark: See Section 3

Monarch Tool & Machine Corp.
1847 Highland Ave.
New Hyde Park, L. I., N. Y.
Metals: D
Facilities: 1, 2, 4, 5

Monroe City Diecasting Co.
135 Front St.
Monroe City, Mo.
Metals: A, D
Facilities: 2, 5
Trademark: See Section 3

Morton Mfg. Co.
7025 Sarpy Ave.
Omaha 7, Neb.
Metals: A, D
Facilities: 1, 2, 3, 4, 5

Mortons Mfg. Co.
141 W. Jefferson
Los Angeles 7, Cal.
Metals: D
Facilities: 1, 6

Mt. Vernon Die Casting Corp.* **
Southfield Ave.
Stamford, Conn.
Metals: A, D
Facilities: 2, 5
Trademark: See Section 3
Representatives: *Stamford, Conn.,* Anker Anderson, Cascade Road; *Cleveland, Ohio,* Grant Eller, 6 E. 194th St.; *E. Orange, N. J.,* George E. Hahl, 39 S. Munn Ave.; *Bala-Cynwyd, Pa.,* G. T. McMaster, Llanberris Apts., C-1; *Guilderland, N. Y.,* David H. King, 75 Willow St.; *Rochester, N. Y.,* William Sauers, 101 Braircliff Rd.; *Skaneateles, N. Y.,* Jerome J. Theobald, 9 E. Genesee St.

A. B. Mueller & Co.
2101 El. John Ave.
St. Louis 7, Mo.
Metals: D
Facilities: 1, 2, 5

Nashua Corporation, N.P.S. Div.
44 Franklin St.
Nashua, New Hampshire
Metals: D
Facilities: 1, 6

National Casting Corp.
6517 - 14th Ave.
Brooklyn, N. Y.
Metals: D, E, F
Facilities: 1, 2, 5

National Die Casting Co.
3635 W. Touhy Ave.
Chicago 45, Ill.
Metals: A, D
Facilities: 1, 2, 3, 5, 6

National Hardware Specialties Ltd.
Box 250
Dresden, Ont., Canada
Metals: D
Facilities: 1, 2, 5
Trademark: See Section 3

National Lead Co.* **
Doehler-Jarvis Div.
525 Cottage Grove, S. E.
Grand Rapids, Mich.
Metals: D
Facilities: 1, 2, 3, 5, 6
Trademark: See Section 3
Representatives: *Detroit, Mich.,* Carl Van Driel, Robert L. Peterson, 3501 Griffin; *Grand Rapids, Mich.,* Steele A. Taylor, Marvin D. Reid, 525 Cottage Grove.

National Lead Co.* **
Doehler-Jarvis Div.
Batavia, N. Y.
Metals: A, B, C
Facilities: 1, 2, 4, 5
Trademark: See Section 3
Representatives: *Batavia, N. Y.,* Edwin F. Chase, Wm. Heiler, Gordon Strunk, A. E. Swanson, c/o Doehler-Jarvis Div.

National Lead Co.* **
Doehler-Jarvis Div.
2100 Smead Ave.
Toledo, O.
Metals: A, D
Facilities: 1, 2, 4, 5
Trademark: See Section 3

National Lead Co.* **
Doehler-Jarvis Div.
Dixie Hwy. & Willamont Rd.
Toledo, O.
Metals: A, D
Facilities: 1, 2, 4, 5
Trademark: See Section 3
Representatives: (Both Toledo, O. plants) *Chicago, Ill.,* G. Strohm, 5155 N. Natoma Ave.; *Clarendon Hills, Ill.,* C. Krehbiel, 20 Mohawk Dr.; *River Forest, Ill.,* W. L. Huber, P. O. Box 28; *Sylvania, O.,* G. Kozlowski, 6136 Sylvan Green Rd.; *Toledo, O.,* F. W. Burgie, Jr., 3214 Westchester Rd., H. L. Byrne, 2708 W. Alexis Rd., R. Harloff, 2366 Heatherwood Dr., C. I. Hodgson, 1123 Hawk, A. Kohn, 749 Waybridge, J. L. O'Brien, 2824 Cheltenham Rd., J. Ruffin, 2909 Kenwood Blvd., E. Warner, 3730 Stannard Dr.

National Lead Co.* **
Doehler-Jarvis Div.
Pottstown, Pa.
Metals: A, D
Facilities: 1, 2, 4, 5, 6
Trademark: See Section 3
Representatives: *North Haven, Conn.,* J. R. Loughran, 1031 Hartford Tnpk.; *Needham, Mass.* A. F. Saylor, 18 Longfellow Rd.; *Livingston, N. J.,* G. F. Huff, 299 Hillside Ave.; *Westfield, N. J.,* J. R. Yocom, 355 W. Dudley Ave.; *Pottstown, Pa.,* H. K. Guldin, 842 N. Evans, D. S. Skean, 1010 Feist Ave., R. I. Yocom, 1125 Queen St.

National Lock Co.
1902 Seventh St.
Rockford, Ill.
Metals: D
Facilities: 1, 2, 3, 4, 5, 6
Trademark: See Section 3

National Ornament Co.
6517 14th Ave.
Brooklyn 19, N. Y.
Metals: D
Facilities: 1, 2, 5

Nelmor Mfg. Corp.
26420 Lakeland Blvd.,
Euclid 32, Ohio
Metals: A, D
Facilities: 1, 2, 3, 5, 6
Tradename: Nelmor

Nelson Metal Products, Inc.* **
510 32nd Street, S.E.
Grand Rapids 8, Mich.
Metals: A, D
Facilities: 1, 2, 5, 6
Trademark: See Section 3

New England Die Casting Co., Inc.
445 Front Ave.
West Haven, Conn.
Metals: A, D
Facilities: 1, 2, 4, 5
Tradename: Nedco
Trademark: See Section 3
Representatives: *North Haven, Conn.,* J. D. MacWilliam, Hartford Turnpike; *New York, N. Y.,* H. A. Rankow Assoc., 175 Fifth Ave.; *Boston, Mass.,* Bart W. Baird, 250 Boylston St.; *New York, N. Y.,* Edgar L. Strauss, 108 E. 86th St.; *Watertown, Conn.,* Dennett E. Evans, 41 Cutler St.

New England Tool Corp.
53 Houghton St.
Hudson, Mass.
Metals: A, D
Facilities: 1, 2, 5

New Products Corp.*
North Shore Drive
Benton Harbor, Mich.
Metals: A, C, D
Facilities: 1, 2, 3, 5, 6
Trademark: See Section 3

Newton Industries, Inc.
100 Saw Mill Rd.
West Haven, Conn.
Metals: D
Facilities: 1, 2, 3, 4, 5, 6

Newton-New Haven Co., The* **
Third Ave.
West Haven, Conn.
Metals: A, D
Facilities: 1, 2, 4, 5
Trademark: See Section 3

F. H. Noble & Company
559 West 59th Street
Chicago 21, Ill.
Metals: D, E
Facilities: 1, 2, 3, 5
Tradename: Trophies For Champions

Nordon Die Casting Co., Inc.* **
30 N. Eighth Ave.
Maywood, Ill.
Metals: A, D
Facilities: 2, 5
Trademark: See Section 3

Norgren-Stemac, Inc.* **
5402 South Delaware
Littleton, Colorado
Metals: D
Facilities: 1, 2, 3, 5, 6
Tradename: Stemac
Trademark: See Section 3

Northern Iowa Die Casting Co.
P. O. Box 93
Spirit Lake, Ia.
Metals: D
Facilities: 1, 2, 5, 6

Norwood Tool & Machine Co.
900 Wood
Three Rivers, Mich.
Metals: A, D
Facilities: 1, 2, 5, 6
Tradename: NORWOOD
Trademark: See Section 3

Ohio Die Casting Corp.
266 E. Fifth Ave.
Columbus 1, O.
Metals: A, D
Facilities: 1, 3, 5, 6
Trademark: See Section 3

Ontario Steel Products Co. Ltd.
Die Casting Div.
St. George St.

Chatham, Ont., Canada
Metals: D
Facilities: 1, 2, 3, 5, 6
Trademark: See Section 3

Oswego Castings Corp.*
Box 222
Oswego, N. Y.
Metals: A
Facilities: 1, 4, 5
Trademark: See Section 3

Pabcast*
355 W. Olive St.
Gardena, Cal.
Metals: A, B, C, D
Facilities: 1, 2, 5
Tradename: PABCAST
Trademark: See Section 3

Page & Hall Mfg. Co., Inc.
1600 Hyde Park Ave.
Boston 36, Mass.
Metals: A, D
Facilities: 1, 2, 5, 6
Trademark: See Section 3

Pagliuso Engineering Co.
113 W. Harvard St.
Glendale 4, Cal.
Metals: A, D
Facilities: 1, 2, 3, 5, 6

Pan American Metal Products Co., Inc.
401 N.W. 71st St.
Miami, Florida
Metals: A, D
Facilities: 1, 5, 6

Paragon Die Casting Co.* **
5851 W. Dickens Ave.
Chicago 39, Ill.
Metals: A, D
Facilities: 2
Tradename: Paragon Cast
Trademark: See Section 3

Paramount Die Casters, Inc.
Freeman Field
Seymour, Ind.
Metals: A, D
Facilities: 5

Paramount Die Casting Co.* **
U. S. 12
St. Joseph, Mich.
Metals: A, C, D
Facilities: 1, 2, 3, 5, 6
Trademark: See Section 3
Representatives: *Shaker Heights, Ohio,* Arthur E. Hills Co., 3588 Normandy Rd.; Detroit, Mich., C. R. Hoffnagle, 18264 James Couzens Hwy.

Paramount Die Casting Products Co.
8313 E. Ten Mile Rd.
Centerline, Mich.
Metals: D
Facilities: 1, 2, 3

Parker White Metal Co.* **
2153 McKinley Ave.
Erie, Pa.
Metals: A, D, E, F
Facilities: 1, 2, 5
Trademark: See Section 3
Representatives: *Chicago, Ill.,* Ollie J. Berger, 2059 E. 72nd St.; *Cincinnati, Ohio,* Wm. H. Broxterman, 2430 Central Pkwy.; *Winter Park, Fla.,* Duane P. Davis, 110 S. Orlando Ave.; *Long Beach, Calif.,* R. W. Fletcher, 2803 Loomis Ave.; *Phoenix, Ariz.,* Fred B. Larsen, 6108 North 11th Ave.; *Girard, Penna.,* Daniel F. Marsh, 35 Chestnut St.; *St. Louis, Missouri,* Frank May, 4378 Lindell Blvd.; *Bellefonte, Penna.,* Warren G. Olson, 420 East Linn St.; *Wilton, Conn.,* Girard L. Palmer, Belden Hill Rd.; *Syracuse, N. Y.,* J. C. Palmer, 712 State Tower Bldg.; *Detroit, Mich.,* Hodgson-Geisler Co., 18917 James Couzens.

Peasley Products, Inc.* **
993 Honeyspot Rd.
Stratford, Conn.
Metals: A, D
Facilities: 1, 2, 5

Peat Mfg. Co.* **
10700 E. Firestone Blvd.
Norwalk, Cal.
Metals: A, D
Facilities: 1, 2, 5
Trademark: See Section 3

Peerless Aluminum Foundry Co., Inc.*

Peerless Die Casting & Permold Div.
55 Andover
Bridgeport, Conn.
Metals: A
Facilities: 2, 4, 5
Trademark: See Section 3

Permanent Casting Co.
P. O. Box 191 — A. P. Station
Hot Springs, Arkansas
Metals: A

Peterson's Machine Shop
258 Russell St.
Lewiston, Me.
Metals: A, D
Facilities: 1, 2, 5

Petoskey Mfg. Co.
200 W. Lake St.
Petoskey, Mich.
Metals: D
Facilities: 1, 2, 3, 5, 6
Tradename: P.M.C.
Trademark: See Section 3

Ben Phillips Nameplates
132 W. Verdugo Ave.
Burbank, Calif.
Metals: D
Facilities: 1, 2, 6

Phoenix Die Casting Co.* **
21 Illinois St.
Buffalo 3, N. Y.
Metals: A, D, E
Facilities: 2
Trademark: See Section 3
Representatives: *Buffalo, N. Y.,* Geo. Keller Machinery Co., 1807 Elmwood Ave.

Pierson Machine Co.
R. D. #2
Telford, Penna.
Metals: D
Facilities: 1, 2, 5
Tradename: Peerlock

Pioneer Diecasters, Inc.* **
4209 Chevy Chase Dr.
Los Angeles 39, Cal.
Metals: A, D
Facilities: 1, 2, 5
Trademark: See Section 3

Pittsburgh Die & Casting Co.* **
7503 Ardmore St.
Swissvale, Pittsburgh 18, Pa.
Metals: A, D
Facilities: 2
Trademark: See Section 3

Pittsburg Industries, Inc.
111 South Elm St.
Pittsburg, Kansas
Metals: A, D, E
Facilities: 1, 2, 5, 6

A. O. Pope Ltd.
90 Winter St.
Saint John, N. B., Canada
Metals: A, B, D
Facilities: 1, 2, 5
Trademark: See Section 3

H. K. Porter Company, Inc.* **
Cleveland Division
4518 Lakeside Avenue
Cleveland, Ohio
Metals: A, D
Facilities: 1, 2, 5

H. K. Porter Co., Inc.* **
Cleveland Division
3270 E. 79th St.
Cleveland 4, Ohio
Metals: A, D
Facilities: 2, 5
Trademark: See Section 3
Representatives: *Cleveland, Ohio,* E. M. Smith, L. J. Smallsreed, 3270 East 79 St., *Pittsburgh, Pa.,* A. W. Anderson, 425 Grant Bldg.; *St. Louis, Mo.,* J. Grant & Co., 1246 Hampton Ave., *Twinsburg, Ohio,* K. Nungesser, 9020 Ravenna Rd.; *Richmond, Ind.,* E. Oswalt, 6 Melody Lane; *Milwaukee, Wisc.,* R. P. Vallee, 759 N. Milwaukee St.; *Ann Arbor, Mich.,* V. VandeMotter, 1200 Saunders Crescent; *Kansas City, Mo.,* J. Wearl, 9809 Belleview; *Los Angeles, Calif.,* E. R. Jackson, 1827 South Hope St.; *Ft. Worth, Texas,* F. Keller Co., 3341 Winthrop, P.O. Box 9008; *Chicago, Ill.,* L. H. Lundstedt, 4554 Broadway; *Independance, Ohio,* C. Stanison, 6212 Brookside Rd.; *Wynnewood, Pa.,* H. T. Sorensen, 425 Charles Lane.

Power Brake Equipment Co.
1632 S.E. 11 Ave.
Portland 14, Oregon
Metals: D
Facilities: 1, 2, 5, 6
Tradename: Williams

Premier Die Casting Co.*
28 Margaretta St.
Newark 5, N. J.
Metals: A, D
Facilities: 1, 2, 3, 4, 5
Trademark: See Section 3

Pressco Casting & Mfg. Corp.*
Broadway & Waverly Rd.
Chesterton, Ind.
Metals: B
Facilities: 1, 2, 3, 4, 5, 6
Tradename: Pressco

Pressure Castings, Inc.* **
21500 St. Clair Ave.
Cleveland 19, O.
Metals: A, D
Facilities: 2, 3, 5, 6
Trademark: See Section 3
Representatives: *Indianapolis, Ind.,* John D. Goodin, 3675 Washington Blvd.; *Boston, Mass.,* I. L. Bambrick, Sheraton Plaza Hotel; *Detroit, Mich.,* R. E. Zimmermann & Sons, 718 Fisher Bldg.; *Rochester, N. Y.,* Hanna & Ferguson, 75 Winton Rd., S.; *Eaton, O.,* Manufacturers Sales Associates, 202 Preble County Bank Bldg., P. O. Box 261; *Chicago, Ill.,* Charles F. Hamilton, 2130 North Harlem Ave.

Pressure Castings Of Canada Ltd.
67 Main St., S.
Weston, Toronto 15, Ont., Canada
Metals: A, D
Facilities: 1, 2, 3, 5, 6
Trademark: See Section 3

Procter Metal Products
P. O. Box 696
San Marcos, Texas
Metals: A, D
Facilities: 1

Product Engineering Co.
4707 S. E. 17
Portland 2, Ore.
Metals: A, D
Facilities: 1, 2, 5, 6
Tradename: Peco

Product Engineering & Mfg. Corp.
Box 57
Bridgman, Mich.
Metals: A, D
Facilities: 1, 2, 3, 5
Tradename: PEMCO
Trademark: See Section 3

Production Aluminum Co.
338 Wealthy S.W.
Grand Rapids, Mich.
Metals: A
Facilities: 5
Tradenames: NA

Production Die Casting Co.*
6502 Rusk Ave.
Houston 11, Tex.
Metals: A, D
Facilities: 1, 2, 3, 5, 6
Trademark: See Section 3

Production Mold & Machine Co.
2112 Leota St.
Huntington Park, Cal.
Metals: D
Facilities: 1, 2, 5

Production Specialities Co.
185 Water St.
Pawtucket, R. I.
Metals: D
Facilities: 1, 5

Products Eng. & Mfg. Corp.
Noeland Ave.
Penndel, Pa.
Metals: D
Facilities: 1, 2, 5

Pyramid Corporation
915 Cleveland
Amarillo, Texas
Metals: A, D, E
Facilities: 1, 2, 5

Quad City Die Casting Co.
3800 River Dr.
Moline, Ill.
Metals: A, D
Facilities: 1, 2, 3, 4, 5, 6

Quality Diecasters
13714-37th N.E.
Seattle 55, Wash.
Metals: D
Facilities: 1, 2, 4, 5

Quality Metal Finishing Co.
Byron, Illinois
Metals: D
Facilities: 1, 3, 5, 6

Racine Die Casting Co.* **
1500 16th Street
Racine, Wis.
Metals: A, D
Facilities: 2, 5
Trademark: See Section 3

Ranchers Corporation
Murrieta, Calif.
Metals: A, D
Facilities: 1, 2, 3, 4, 5, 6

Rangers Die Casting Co., Inc.*
10828 S. Alameda
Lynwood, Cal.
Metals: A
Facilities: 1, 2, 5
Tradename: Rangers
Trademark: See Section 3

Reese Padlock Co.
128 Sherman
Lancaster, Pa.
Metals: D
Facilities: 1, 2, 3, 5, 6

A. C. Rehberger Co.
2134 N. Magnolia
Chicago 14, Ill.
Metals: B, D
Facilities: 1, 3, 5
Tradename: REH-CRAFT

Republic Die Casting Co.* **
611 Talcott Ave.
St. Louis 7, Mo.
Metals: A, D
Facilities: 1, 2, 3, 5, 6
Trademark: See Section 3

Reuhl Products, Inc.
4505 W. Beltline Hwy.
Madison, Wis.
Metals: D
Facilities: 1, 2, 5, 6
Tradename: Reuhl

Rhopac Inc.
3425 Cleveland
Skokie, Ill.
Metals: E
Facilities: 2

Richmond Machine Tool & Die Casting Co. Ltd.
5680 Fullum Street
Montreal 10, Que., Canada
Metals: A, D
Facilities: 2, 3, 4, 5, 6
Trademark: See Section 3

Roberts Engineering & Mfg. Co., Inc.
640 Navigation Blvd., Box 4060
Corpus Christi, Tex.
Metals: A, D
Facilities: 1, 2, 5

Rollin Wilson Company, The
1213 Empire Ave.
Memphis, Tenn.
Metals: D

Romada Tool & Mfg. Co.
9536 Dearborn Ave.
Detroit 9, Mich.
Metals: D
Facilities: 1, 2, 5, 6

Ross Sprinkler Co., The
4333 Temple City Blvd.
Rosemead, Cal.
Metals: D
Facilities: 1, 5
Tradename: Ross #11

Rowe Plastics & Die Casting Co.
955 W. Schubert Ave.
Chicago 14, Ill.
Metals: A, D
Facilities: 1, 2, 5
Trademark: See Section 3

Ruffe, Inc.
7525 N. W. 37th Ave.
Miami, Fla.
Metals: A
Facilities: 1, 2, 3, 4, 5, 6

Rupert Diecasting Co.*
1658 Cleveland Ave.
Kansas City 27, Mo.
Metals: A, D
Facilities: 1, 2, 3, 4, 5
Trademark: See Section 3

Rutherford Bros. Plating Co.
318 E. Cross (Mailing Address)
Ypsilanti, Mich.
Metals: D
Facilities: 3

S-K-S Die Casting Co.
739 Allston Way
Berkeley, Calif.
Metals: A, D, E
Facilities: 1, 2, 5
Tradename: S-K-S Berkeley
Trademark: See Section 3

S.U.S. Die Casting Co., Inc.
41 E. Market
Logansport, Ind.
Metals: A
Facilities: 2, 5
Tradename: "Strength Under Stress"
Trademark: See Section 3

Saginaw Bay Industries, Inc.
242 N. Water
Bay City, Mich.
Metals: A, C
Facilities: 1, 4, 5, 6
Trademark: See Section 3

St. Louis Diecasting Corp.* **
4528 Oleatha Ave.
St. Louis 16, Mo.
Metals: A, D
Facilities: 1, 2, 3, 4, 5
Trademark: See Section 3

San Jose Die Casting Corp.
815 Chestnut
San Jose 10, Cal.
Metals: A, B, D, E
Facilities: 1, 5
Trademark: See Section 3

Scherer Mfg. Co.
Alyce Ave.
Cedarburg, Wis.
Metals: A
Facilities: 1, 2, 5
Trademark: See Section 3

K. E. Schoell Co.
764 N. W. 75 St.
Miami, Fla.
Metals: D, E, F
Facilities: 2

Schultz Die Casting Co.* **
1810 Clinton
Toledo 7, O.
Metals: D
Facilities: 2, 5
Trademark: See Section 3

Schultz Die Casting Co. of Canada Ltd.* **
Wallaceburg, Ont., Canada
Metals: A, D
Facilities: 1, 2, 3, 4, 5, 6
Trademark: See Section 3

Seaboard Diecasting Corp.
1125 Prospect Ave.
West Islip, L. I., N. Y.
Metals: D
Facilities: 1, 2, 3, 5
Trademark: See Section 3

Serv-All Die & Tool Co.
Box 117
Crystal Lake, Ill.
Metals: D

Sheldon Die Casting Co.
859 N. Prior Ave.
St. Paul 4, Minn.
Metals: A, D
Facilities: 1, 2, 5

Sherman Pressure Casting Corp.* **
601 W. 26
New York 1, N. Y.
Metals: A, C, D
Facilities: 1, 2, 5
Trademark: See Section 3

Soper Mfg. Co.
1099 Milton
Benton Harbor, Mich.
Metals: D
Facilities: 2, 5
Trademark: See Section 3

Southern California Plating Co.

U. S. License Frame Mfg. Co. & Mfg. Div.
3436 San Fernando Rd.
Los Angeles 65, Cal.
Metals: A, D
Facilities: 1, 2, 3, 5, 6
Tradename: U. S. BRAND

Southern Industrial Die Casting Co.
P. O. Box 21
Moultrie, Ga.
Metals: A, D
Facilities: 2

J. W. Speaker Corp.
3059 N. Weil
Milwaukee 12, Wis.
Metals: D
Facilities: 1, 2, 5, 6

Speedmaster Engineering Co.
900 Doolittle Dr.
San Leandro, Cal.
Metals: A, B, D
Facilities: 1, 2, 5

Springfield Die Casting Co., Inc.* **
725 Lexington Ave.
Kenilworth, N. J.
Metals: D

Starlight Specialties Inc.
22-14 40th Ave.
Long Island City 1, N. Y.
Metals: D
Facilities: 1, 6

Staver Co., Inc., The
41 North Saxon Ave.
Bay Shore, N. Y.
Metals: E
Facilities: 1, 2, 4, 5

Stella Products Corp.* **
66 Okner Pkwy.
Livingston, N. J.
Metals: D
Facilities: 1, 2, 3, 5, 6
Trademark: See Section 3

M. Stephens Mfg., Inc.
814 E. 29
Los Angeles 11, Cal.
Metals: D
Tradename: Stephens

Sterling Aluminum Products, Inc.
2600 N. Third
St. Charles, Mo.
Metals: A
Facilities: 2, 4, 5
Trademark: See Section 3

Sterling Die Casting Co., Inc.* **
743 39th St.
Brooklyn 32, N. Y.
Metals: A, D
Facilities: 2, 3, 5, 6
Trademark: See Section 3

J & E Stevens Co.
Nooks Hill Rd.
Cromwell, Conn.
Metals: D
Facilities: 1, 3, 5, 6

W. A. Stevenson Co.
12473 Grand River Ave.
Detroit 4, Mich.
Metals: A, D
Facilities: 1, 2

Stewart-Warner Corp.* **

Stewart Die Casting Div.
4535 W. Fullerton Ave.
Chicago, Ill.
Metals: A, C, D
Facilities: 1, 2, 3, 4, 5, 6
Tradename: STEWART
Trademark: See Section 3

Stewart-Warner Corp.* **

Stewart Die Casting Div.
275 Warren
Bridgeport, Conn.
Metals: A, C, D
Facilities: 1, 2, 3, 4, 5, 6
Tradename: STEWART
Trademark: See Section 3

Stricker Brunhuber Corp.
1915 24th St.
New York, N. Y.
Metals: A, D, E
Facilities: 1, 2, 5

Strite-Anderson Mfg. Co.
1920 Washington Ave., S.
Minneapolis, Minn.
Metals: A, D, E
Facilities: 1, 2, 5, 6

**Stroh Die Casting Co., Inc.* **
11123 W. Burleigh
Milwaukee 10, Wis.**
Metals: A, D
Facilities: 5
Trademark: See Section 3
Representatives: *Milwaukee, Wisconsin,* George C. Meier, 11123 W. Burleigh Street.

Super Grip Anchor Bolt Co., Inc.
3333 N. 22
Philadelphia 40, Pa.
Metals: A, D
Facilities: 1, 5, 6
Trademark: See Section 3

Superba Die Castings
Box 147
Ft. Recovery, O.
Metals: D
Facilities: 1, 5, 6

Superior Die Casting Co., The * **
1001 London Rd.
Cleveland 10, O.
Metals: A, D
Tradename: SuperCast
Trademark: See Section 3

**Syracuse Die Casting & Mfg. Co.
2101 Teall Ave.
East Syracuse, N. Y.**
Metals: A, D, E, F
Facilities: 2, 5
Trademark: See Section 3

T Die Cast & Molded Products
11627 S. Main
Los Angeles 61, Cal.
Metals: A, D
Facilities: 1, 2, 5
Tradename: TEE
Trademark: See Section 3

Tann Corp.* **

Congress Die Casting Div.
3750 E. Outer Dr.
Detroit 34, Mich.
Metals: D
Facilities: 1, 2, 3, 5, 6
Trademark: See Section 3

Techni-Cast Corp.* **
600-608 Walnut
Hamilton, O.
Metals: A, D
Facilities: 2, 5
Tradename: TECHNI-QUALITY
Trademark: See Section 3

Thompson Products, Inc.*
Light Metals Div.
2269 Ashland Rd.
Cleveland 3, O.
Metals: A,
Facilities: 1, 4, 5, 6
Trademark: See Section 3

Titan Metal Mfg. Co.*
Bellefonte, Pa.
Metals: B
Facilities: 1, 2, 4, 5
Tradename: Titan Brass Pressure Die Castings
Trademark: See Section 3

E. Toman & Co.
8700 W. 47
Lyons, Ill.
Metals: A, D
Facilities: 1, 2, 3, 5, 6
Trademark: See Section 3

Tool-Die Engineering Co., The* **
9210 Loren Ave.
Cleveland 5, O.
Metals: A, D
Facilities: 5
Trademark: See Section 3

Tri-State Die Casting Corp.
Fourth & Ingram Streets
Henderson, Ky.
Metals: A, D
Facilities: 1, 2, 3, 5, 6
Tradename: Tri-State
Trademark: See Section 3

Turner Mfg. Co., Inc.
404 W. Superior St.
Kokomo, Ind.
Metals: E
Facilities: 2, 5

Tuttle Electric Products, Inc.
Kirkland, Ill.
Metals: D
Facilities: 1, 3

**Twin City Die Castings Co.* **
Talmage & 33rd Ave., S. E.
Minneapolis 14, Minn.**
Metals: A, D, E, F
Facilities: 2, 5
Trademark: See Section 3

Union Die Casting Co.* **
676 Putnam Dr.
Whittier, Cal.
Metals: A, D
Facilities: 1, 2, 3, 4, 5, 6
Tradename: UDICO
Trademark: See Section 3

Universal Die Casting Corp.
3500 N. W. 59th St.
Miami 42, Florida
Metals: A, D
Facilities: 1, 2, 4, 5, 6
Tradename: UDC

Univex Die Cast & Engineering Co.
7001 Chase Rd.
Dearborn, Mich.
Metals: D
Facilities: 1, 2, 3, 5, 6
Tradename: UNIVEX
Trademark: See Section 3

Van Way Die Casting & Tool Co.
866 Kaynyne St.
Redwood City, Calif.
Metals: A, D
Facilities: 2, 5
Trademark: See Section 3

Varland Metal Service, Inc.
1350 Arlington
Cincinnati 25, O.
Metals: A, D
Facilities: 2, 3, 5, 6

Veeder-Root Inc.
P. O. Box 1591
6th Ave. Rd. at Burns Ave.
Altoona, Pa.
Metals: A, D
Facilities: 2, 5, 6
Tradename: Veeder, Veeder-Root
Trademark: See Section 3

Watchung Die Casting Corp.
Watchung, N. J.
P. O. Box 828
Plainfield, N. J. (Mailing Address)
Metals: A, D
Facilities: 2, 5

Waterbury Lock & Specialty Co., The
203 Broad
Milford, Conn.
Metals: D
Facilities: 1, 2, 3, 4, 5, 6
Tradename: WALSCO

Wayland Co.
2632 W. Grand Ave.
Chicago 12, Ill.
Metals: D
Facilities: 1, 2, 3, 5

Webarm Diecasting, Inc.
71 Montaup
Fall River, Mass.
Metals: A, D
Facilities: 2, 5
Tradename: Color-Cast

Wells Die Casting Co. of Calif.* **
43 Dore Street
San Francisco, Calif.
Metals: A, B, D
Facilities: 2, 5
Tradename: Wells S. F.
Trademark: See Section 3

Wells Mfg. Co., Inc.
New Vienna, O.
Metals: D
Facilities: 1, 6

Wessel Hardware Corp.
919-31 N. 5th St.
Philadelphia 23, Pa.
Metals: D
Facilities: 1, 2, 5, 6

West Coast Die Casting Co.
2463½ N. Chico Ave.
El Monte, Calif.
Metals: A, D
Facilities: 1, 2, 5

West Irving Die Casting Co.*
240 S. Evergreen
Bensenville, Ill.
Metals: A
Facilities: 2, 4, 5
Trademark: See Section 3

Western Die Casting Co.* **
4065 Hollis
Emeryville 8, Cal.
Metals: A, B, C, D
Facilities: 2, 5
Tradename: WDCO
Trademark: See Section 3

Westland Die Casting, Inc.* **
Div. of Westland Tool & Mfg. Co.
4617 Sperry
Los Angeles 39, Cal.

Metals: A, B, D
Facilities: 1, 2, 5
Trademark: See Section 3

Wheaton Die Casting Corp.* **
North Tenth St.
Millville, N. J.
Metals: A, D
Facilities: 5, 6
Trademark: See Section 3

White Die Casting Co.
Monad Street at Head
Dundas, Ont., Canada
Metals: A, D
Facilities: 1, 2, 3, 5
Trademark: See Section 3

White Manufacturing Company
410 E. Fillmore Street
Colorado Springs, Colorado
Metals: A
Facilities: 1, 2, 5, 6

Whitehead Die Casting Co.
1140 Zonolite Rd., N. E.
Atlanta 6, Ga.
Metals: A, D, E
Facilities: 1, 2, 3, 4, 5
Tradename: ATLAS

Withrow Die Casting Co.* **
13164 Leadwell St.
North Hollywood, Cal.
Metals: A, B, D
Facilities: 1, 2, 5
Trademark: See Section 3

Wolverine Die Cast Corp.
13700 Mt. Elliott
Detroit 12, Mich.
Metals: A, D
Facilities: 2, 3, 5
Trademark: See Section 3

Wright Engineering & Supply Co.
1300 S. Bannock
Denver 23, Colo.
Metals: A, C
Facilities: 1, 2, 3, 5, 6

Yoder Die Casting Corp.* **
727 Kiser
Dayton 4, O.
Metals: A, D
Facilities: 2, 3, 5, 6
Trademark: See Section 3

Zenith Diecasting, Inc.
5164 Alcoa Ave.
Los Angeles 58, Cal.
Metals: A, B, D
Facilities: 1, 2
Trademark: See Section 3

SECTION 2 | 1958 DIE CASTING DIRECTORY

GEOGRAPHICAL DIRECTORY

ALABAMA

Birmingham

Acton-Hopkins Machine & Foundry Co., 2615 2nd Ave. N.
Metal-Cast Co., 620 16th Ave., W.

Florence

Alabama Wire Co., Inc., Sycamore & Terrace Sts.

ARKANSAS

Harrison

Arkansas Die Casting Corp., Box 26

Hot Springs

Permanent Casting Co., P. O. Box 191—A. P. Station

Little Rock

Hamlin Products, Inc., 7600 Asher Ave., P. O. Box 2016

Malvern

General Motors Corp., Fabricast Div., P. O. Box 211
Hoover Ball & Bearing Co., Glenvale Products Div.

CALIFORNIA

Anaheim

Kwikset Locks, Inc., 516 E. Santa Ana

Berkeley

Alacast Corp., 2229—4th St.
Benda Tool & Model Works, 1444 Fourth St.
S-K-S Die Casting Co., 739 Allston

Burbank

Bucy Mfg. Co., 625 S. Glenwood Pl.
Ben Phillips Nameplates, 132 W. Verdugo Ave.

Culver City

Coast Die Casting Co., 5752 Joanne
Robert A. Cox Die Casting Co., 11418 Knightsbridge Ave.
Imperial Die Casting Corp., 11411 Knightsbridge Ave.

El Cajon

El Cajon Die Casting & Mfg. Co., 590 Marshall Ave.

El Monte

El Monte Tool & Die Casting, Inc., 2425 N. Tyler Ave.
Lansco Die Casting Co., 2029 N. Chico Ave.
West Coast Die Casting Co., 2463½ N. Chico Ave.

Emeryville

Western Die Casting Co., 4065 Hollis

Gardena

A & A Die Casting Co., 12901 S. Western Ave.
Die Cast Products, Inc., 621 W. Rosecrans Ave.
Pabcast, 355 W. Olive St.

Glendale

Ambrit Industries, Inc., 1288 Los Angeles
Pagliuso Engineering Co., 113 W. Harvard St.

Harbor City

Advanced Manufacturing, Inc., 1214 W. 254

Huntington Park

Production Mold & Machine Co., 2112 Leota St.

Inglewood

Jos. P. Manz Die Casting Co., 550 W. Beach Ave.

Los Angeles

Acme Tool & Die Casting Co., 4250 E. Washington Blvd.
Alloy Die Casting Co., 2211 Firestone Blvd.
Aluminum Die Casting Co., 3452 San Fernando Rd.
Anderson Die Casting & Engineering Co., 1000 E. 60
Atlas Auto Products, Inc., 5815 Wilmington Ave.
Challenger Lock Co., Inc., 4865 Exposition Blvd.
H & S Metal Products Co., 4159 Whiteside St.
Harvill Corp., 6251 W. Century Blvd.
Los Angeles Die Casting Co., 340 Crocker
Mortons Mfg. Co., (Moderd Auto Accessories, Inc.), 141 W. Jefferson
Pioneer Diecasters, Inc., 4209 Chevy Chase Dr.
Southern California Plating Co., U. S. License Frame Mfg. Co. & Mfg. Div., 3436 San Fernando Rd.
M. Stephens Mfg., Inc., 814 E. 29
T Die Cast & Molded Products, 11627 S. Main
Westland Die Casting Div. of Westland Tool & Mfg. Co., 4617 Sperry
Zenith Diecasting, Inc., 5164 Alcoa

Lynwood

Rangers Die Casting Co., Inc., 10828 S. Alameda

Murrieta

Ranchers Corporation

North Hollywood

Withrow Die Casting Co., 13164 Leadwell St.

Norwalk

Peat Mfg. Co., 10700 E. Firestone

Oakland

Casper's Machine Shop, 1047 77th
Kolsters Tool & Die, Co. 8451 Baldwin St.

Pasadena

W. L. Chapman Co., 2886 E. Walnut
Crown City Die Casting Co., 84 N. Fulton Ave.

Redwood City

Van Wey Die Casting & Tool Co., 866 Kaynyne St.

Rivera

J. E. Dietz Mfg. Co., 9216 Bermudez

Rosemead

Ross Sprinkler Co., The, 4333 Temple City Blvd.

San Francisco

Wells Die Casting Co. of Calif., 43 Dore Street

San Jose

San Jose Die Casting Corp., 815 Chestnut

San Leandro

Speedmaster Engineering Co., 900 Doolittle Dr.

Santa Monica

Monarch Die Casting Corp., 1642 20th St.

South Gate
Colbert Die Cast Co., 5416 Tweedy
DeRoy Mfg. Co., 9208 Atlantic Ave.

Torrance
Harvey Aluminum, 19200 S. Western Ave.

Whittier
Fanarc Mfg. Co., 1115 W. Whittier
Union Die Casting Co., 676 Putnam

COLORADO

Colorado Springs
White Manufacturing Company, 410 E. Fillmore Street

Denver
Gemco Mfg. Co., 501 S. Lipan
Wright Engineering & Supply Co., 1300 S. Bannock

Littleton
Norgren-Stemac, Inc., 5402 South Delaware

CONNECTICUT

Cromwell
J & E Stevens Co., Nooks Hill Rd.

Bridgeport
Engineers Tool & Mfg. Co., Inc., 7 Island Brook Avenue
Peerless Aluminum Foundry Co., Inc., Peerless Die Casting & Permold Div., 55 Andover
Stewart-Warner Corp., Stewart Die Casting Div., 275 Warren

Milford
Waterbury Lock & Specialty Co., The, 203 Broad

Plantsville
Bruce Mfg. & Molding Co., Inc., Atwater St.

Shelton
Manger Die Casting Co., Inc., 1 Maple

Stamford
Calko Die Casting Co., 43 Sunnyside Ave., P.O. Box 552
Conetta Tool & Die Co., Inc., 73 Sunnyside Ave.
Mt. Vernon Die Casting Corp., Southfield Ave.

Stratford
Peasley Products, Inc., 993 Honeyspot Rd.

West Haven
New England Die Casting Co., Inc., 445 Front Ave.
Newton Industries, Inc., 100 Saw Mill Rd.
Newton-New Haven Co., Inc., The, Third Ave.

FLORIDA

Miami
Die Casting Corp. of Florida, 3000 N. W. 75
Industrial Die Cast & Mfg. Co., Inc., 2980 N.W. 22nd
Pan American Metal Products Co., Inc., 401 N.W. 71st St.
Ruffe, Inc., 7525 N. W. 37th Ave.
K. E. Schoell Co., 764 N. W. 75 St.
Universal Die Casting Corp., 3500 N. W. 59th St.

North Miami
Ludman Corp., 14100 Biscayne Blvd.

GEORGIA

Atlanta
Whitehead Die Casting Co., 1140 Zonolite Rd., N. E.

Moultrie
Southern Industrial Die Casting Co., P. O. Box 21

ILLINOIS

Aurora
Aurora Metal Co., 614 W. Park Ave.

Barrington
Barrington Tool & Engineering Co., 335 E. Station

Bellwood
Aluminum Company of America, Madison & Mannheim Rd.

Bensenville
West Irving Die Casting Co., 240 S. Evergreen

Byron
Quality Metal Finishing Co.

Chicago
ABCO Die Casting Corp., 330 N. Harding Ave.
Ability Die Casting, 865 N. Sangamon
Admiral Die Castings, A Div. Portable Electric Tools, Inc., 250 W. 83
Ainsworth-Precision Casting Co., Div. of Harsco Corp., 5959 W. Howard
Albany Plating & Die Casting Co., 464 W. 33
American Flange Mfg. Co., Inc., 825 S. Kilpatrick
Anderson Tool & Mfg. Co., 3450 N. Kostner Ave.
Atomic Die Casting Corp., 7817 S. Claremont Ave.
Banthrico Industries, Inc., 17 N. Desplaines
Central Die Casting & Mfg. Co., Inc., 2935 W. 47
Century Die Casting Co., 2629 W. Fletcher
Chicago Die Casting Mfg. Co., 2510 W. Monroe
Chicago Expansion Bolt Co., 1338 W. Concord Pl.
Chicago White Metal Casting, Inc., 5239 W. Grand Ave.
DeCardy Bros. Co., 1806 N. Keeler
Dialoy, Inc., 214 S. Clinton
Dowst Manufacturing Co., 600 North Pulaski Rd.
Eklind Tool & Mfg. Co., 2627 N. Western Ave.
Enhorning Industries, 2013 W. 69
Federal Die Casting Co., 2220 Elston
Hayden Mfg. Co., 173 N. Peoria
Heick Die Casting Corp., 6550 W. Diversey Ave.
Illinois Advance Die & Mold Co., 2005 N. Major Ave.
Illinois Lock Co., The, 819 S. Ada
Industrial Die Casting Co., 2300 N. Lister Ave.
Jet Die Casting Corp., 1317 W. Concord Pl.
Kamin Die Casting & Mfg. Co., 3315 N. Knox Ave.
Paul Krone Die Casting Co., 1811 N. Kostner Ave.
Logan Industries, Inc., 1640 W. Carroll Ave.
Mid-Western Die Casting Co., 1501 N. Halsted Street
Modern Die Casting Corp., 5419 N. Kedzie Ave.
National Die Casting Co., 3635 W. Touhy Ave.
F. H. Noble & Company, 559 W. 59
Paragon Die Casting Co., 5851 W. Dickens Ave.
A. C. Rehberger Co., 2134 N. Magnolia
Rowe Plastics & Die Casting Co., 955 W. Schubert Ave.
Stewart-Warner Corp., Stewart Die Casting Div., 4535 W. Fullerton
Wayland Co., 2632 W. Grand Ave.

Crystal Lake
Serv-All Die & Tool Co., Box 117

Elmwood Park
Grand Die Casting, Inc., 7936 W. Grand Ave.

Franklin Park
Aallied Die Casting & Mfg. Co., Inc., 10029 Pacific Avenue

Hamilton
Ehrhart Die Casting Co., K.O.K.X.

Kirkland
Tuttle Electric Products, Inc.

Lanark
Forster-Appelt Mfg. Co., Inc., 82 E. Lanark Ave.

Lyons
E. Toman & Co., 8700 W. 47

Maywood
Callen Mfg. Corp., 1425 N. First Ave.
Nordon Die Casting Co., Inc., 30 N. Eighth Ave.

Moline
Quad City Die Casting Co., 3800 River Dr.

Quincy
Central Pattern Co., 134-36 So. Front St.

Rockford
Ainsworth-Precision Castings Co., Div. of Harsco Corp., 2025 Kishwaukee St.
Amerock Corp., 4000 Auburn Street
J. I. Case Co., Magneto Div., S. Independence Ave.
National Lock Co., 1902 Seventh St.

Schiller Park
Delta Die Casting Corp., 9393 W. Seymour Ave.

Skokie
Acme Die Casting Corp., 8245 N. Kimball Ave.
DuPage Die Casting & Fabricating Co., Inc., 8049 N. Ridgeway Ave.
Inland Die Casting Co., Inc., 8141 N. Lawndale
Rhopac Inc., 3425 Cleveland

Winfield
Hadlock & Temte, Inc., P. O. Box 405

Woodstock
Electric Auto-Lite Co., The, Woodstock Div., 501 Clay Street

INDIANA

Albany
Littler Diecast Corp., P. O. Box 351, State Rd. 67

Bedford
General Motors Corp., Fabricast Div., P. O. Box 271

Chesterton
Pressco Casting & Mfg. Corp., Broadway & Waverly Rd.

Evansville
Faultless Caster Corp., 1421 N. Garvin

Indianapolis
General Electroplating Co., 601 Russell Ave.

Kokomo
Turner Mfg. Co., Inc., 404 W. Superior

Logansport
Alpha Industries, Die Casting Div., 1300 Wheatland Ave.
S.U.S. Die Casting Co., Inc., 41 E. Market

Muncie
Kiser Plating Co., Inc., P. O. Box 904, 401 East Howard St.

Seymour
Paramount Die Casters, Inc., Freeman Field

Union City
Hardy Mfg. Corp., Sub. of Sheller Mfg. Corp.

Valparaiso
Indiana Steel Products Co., The

Waterloo
Kitchen-Quip, Inc., E. Marion Street

Winchester
Aluminum Diecast Foundries, Inc., P. O. Box 69.

IOWA

Dubuque
Ertl Co., The, 2475 Ertl Lane

Marshalltown
Bruin Mfg. Co., 607 N. Fourth Ave.
Kiowa Corp., 1200 E. May St.

Spirit Lake
Northern Iowa Die Casting Co., P. O. Box 93

Webster City
Arrow-Acme Corp., 411 Prospect

KANSAS

Pittsburg
Pittsburg Industries, Inc., 111 South Elm St.

KENTUCKY

Henderson
Gibbs Automatic Moulding Corp., 1106 5th Street
Tri-State Die Casting Corp., Fourth & Ingram Sts.

MAINE

Lewiston
Peterson's Machine Shop, 258 Russell St.

MARYLAND

Cambridge
Caldwell Casting Co., Inc., The, Market St.

Crisfield
Chas. D. Briddell, Inc.

MASSACHUSETTS

Boston
L. E. Mason Company, 98 Business
Page & Hall Mfg. Co., Inc., 1600 Hyde Park Ave.

Fall River
Fall River Tool & Die Co., 4 Walker
Webarm Diecasting, Inc., 71 Montaup

Hudson
New England Tool Corp., 53 Houghton St.

Springfield
Hampden Brass & Aluminum Co., 262 Liberty

Waltham
Form-A Die Casting Corp., 100 Felton Street

Worcester
Kennedy Die Castings, Inc., 200 Harding St.

MICHIGAN

Adrian
Hoover Ball & Bearing Co., Adrian Division

Almont
Hurd Lock & Mfg. Co., Almont Div.

Auburn
Allmetal Diecast Co., 1632 W. Midland Road

Bangor
Du-Wel Metal Products, Inc., P. O. Box 307

Bay City
Saginaw Bay Industries, Inc., 242 N. Water

Benton Harbor
Benton Harbor Malleable Industries, Inc., 171 Graham Ave.
New Products Corp., North Shore Drive
Soper Mfg. Co., 1099 Milton

Berrien Springs
Fisk Products Inc., 207 N. Main St.

Big Rapids
Denham Mfg. Co., Pere Marquette St.

Bridgman
Product Engineering & Mfg. Corp., Box 57

Centerline
Paramount Die Casting Products Co., 8312 E. Ten Mile Rd.

Clawson
Grand Steel & Mfg. Co., 1400 W. 14 Mile Rd.

Clinton
Clinton Machine Co., Die Cast Div.

Davison
Burton Die Casting Co., G-6427 Davison Rd.

Dearborn
Univex Die Cast & Engineering Co. 7001 Chase Rd.

Detroit
Accessories Mfg. Co., 5075 14th St.
Adjel Products Co., 13561 Helen Ave.
Continental Die Casting Corp., 9615 Grinnell Ave.
Dearborn Diecasting & Cavity Co., 199 Vinewood Ave.
Detroit Die Casting Corp., 597 Beaufait Ave.
Detroit Ice Machine Co., 2615 12th
Engineering Cast Products, 17601 Swift
Exact Tool & Die Co., 5829 Tireman
C. M. Hall Lamp Co., 1035 E. Hancock
Helm Accessories, Inc., 8820 Grinnell
Ken-Moore Die Cast, 12299 Woodbine
Lee Silver Service, Inc., 13561 Helen
Romada Tool & Mfg. Co., 9536 Dearborn Ave.
W. A. Stevenson Co., 12473 Grand River Ave.
Tann Corp., Congress Die Casting Div., 3750 E. Outer Dr.
Wolverine Die Cast Corp., 13700 Mt. Elliott

Dowagiac
Consolidated Die Cast Corporation of America

Eau Claire
Hermel Die Casting Corp.

Ferndale
General Die Casting Co., 1956 Burdette

Flat Rock
H & M Industries, Inc., 26810 Telegraph Rd.

Flint
General Motors Corp., AC Spark Plug Div., 1300 N. Dort Highway

Fowlerville
Hoover Ball & Bearing Co., Utilex Div.

Grand Rapids
American Die Casting Co., 850 Pannell St., N.W.
Brillcast, Inc., 2544 Thornwood, S.W.
Congdon Die Casting Co., 1266 Godfrey Ave., S.W.
Grand Rapids Brass Co., Div. of Campton Mfg. Co., 420 50th St., S.W.
Grand Rapids Die Casting Co., 2125 Turner Rd., N. W.
Kent Casting Corp., 200 Garden St., S.E.
Mid-State Die Casting Co., 7878 S. Division Ave.
National Lead Co., Doehler-Jarvis Div., 525 Cottage Grove, S.E.
Nelson Metal Products, Inc., 510 32nd Street, S.E.
Production Aluminum Co., 338 Wealthy S.W.

Grandville
Jervis Corporation

Holland
Holland Die Casting Co., Inc., 582 Gordon

Jackson
Litemetal Dicast, Inc., 1927 Wildwood Ave.

Kalamazoo
Kalamazoo Die Casting Co., Mastenbrook Dr. & Milham Rd.

Madison Heights
Dynamic Die Casting Co., 510 W. Ten Mile Rd.

Marysville
Fort Die Casting Corp., 2409 Wills

Melvindale
Atlantic Die Casting Co., 17740 Clarann

Middleville
Kaljer Manufacturing Co. Div. of Jervis Corp.

Midland
Dow Chemical Co., The, Magnesium Die Casting Sales

Muskegon
Buehrle Engineering Co., 856 E. Broadway

Petoskey
Petoskey Mfg. Co., 200 W. Lake St.

St. Joseph
Laboratory Equipment Corp., Hilltop Rd., P.O. Box 151
Leco Plating Co., Hilltop Rd.
Paramount Die Casting Co., U. S. 12

Saline
Alumiloy Fabricators, Inc., 202 W. Bennett
Hoover Ball & Bearing Co., Universal Die Casting Div.

South Haven
Magnesium Industries, Inc., 1313 Kalamazoo

Three Rivers
Norwood Tool & Machine Co., 900 Wood

Van Dyke
Lincoln Die Casting, Inc., 20805 Mound Rd.

Willow Run
Monarch Governor Co., 2800 Tyler

Ypsilanti
Rutherford Bros. Plating Co., 7 Emerick (Plant), 318 E. Cross (Mailing Address)

MINNESOTA

Minneapolis
Blaking Co., 921 N. E. Main
Char-Lynn Co., 2843 26th Avenue, S.
Strite-Anderson Mfg. Co., 1920 Washington Ave., S.
Twin City Die Castings Co., Talmage & 33rd Ave., S.E.

St. Paul
Lloyd Products, Inc., 1837 University
Sheldon Die Casting Co., 859 N. Prior

Winona
Lake Center Switch Co., 51 Johnson

MISSOURI

Buckner
Lyons Diecasting Co.

Kansas City
Kuhlman Diecasting Co., 7300 East 17th St.
Rupert Diecasting Co., 1658 Cleveland

Monroe City
Monroe City Diecasting Co., 135 Front St.

St. Charles
Sterling Aluminum Products, Inc., 2600 N. Third

St. Louis
Clyde Equipment Co., 3816 McDonald

Missouri Diecasting Co., 1411 N. 17 St.
A. B. Mueller & Co., 2101 El. John
Republic Die Casting Co., 611 Talcott
St. Louis Diecasting Corp., 4528 Oleatha Ave.

NEBRASKA

Omaha

Morton Mfg. Co., 7025 Sarpy Ave.

NEW HAMPSHIRE

Nashua

Great American Plastics Co., Factory
Nashua Corporation, N.P.S. Div., 44 Franklin St.

NEW JERSEY

New Brunswick

Excel Products Co., Inc., Codwise Ave. & Elizabeth St.

Nutley

Harbot Die Casting Corp., 52 E. Centre

East Orange

C. M. Grey Industries Inc., 358 Central Ave.

Elizabeth

Central Casting Co., 400-416 Trumbull

Garwood

Aluminum Company of America

Irvington

American Aluminum Casting Co., 332-334 Coit
Dollin Corp., 600 S. 21
Irvington Die Casting Co., 133 S. 20
Jersey Plastic & Die Casting Co., 149 Shaw Ave.

Kenilworth

Springfield Die Casting Co., Inc., 725 Lexington Ave.

Livingston

Stella Products Corp., 66 Okner

Millville

Wheaton Die Casting Corp., North Tenth Street

Newark

Art Jack Die Casters, Inc., 36 Goble
Camp Aircraft Parts, Inc., 1133-39 McCarter Hwy.
Duane Specialties, Ltd., 209 Parkhurst
Micro-Products Engineering Co., 230 Ridgewood Ave.
Premier Die Casting Co., 28 Margaretta

North Bergen

Beaut Mfg. Co., Inc., 7500 Tonnelle

Ridgefield

Diecasters, Inc., 720 Grand Ave.

Springfield

Haug Die Casting Corp., 52 Brown

Teterboro

Bendix Foundries, Bendix Aviation Corp.

Trenton

Hooper Die Casting, 300 Maple Ave.

Watchung

Watchung Die Casting Corp., P. O. Box 828, Plainfield, N. J. (Mailing Address)

NEW YORK

Bay Shore

Gasket, Packing & Specialty Co., Inc., 41 N. Saxon
Staver Co., Inc., The, 41 North Saxon

Batavia

National Lead Co., Doehler-Jarvis Div.
Kisiel Die Casting Works, 127 Otis

Bronx

Finkel Umbrella Frame Co., Inc., 200 Brush Ave.

Brooklyn

American Casting & Mfg. Corp., 30 Main St.
Advance Pressure Castings, Inc., 20-30 Wythe Ave.
Danacor Co., 430 Carroll
Dieco Die Casting Corp., 59-27 Decatur
Metro Casting Co. Inc., 47 Grattan
National Casting Corp., 6517—14th St.
National Ornament Co., 6517 14th
Sterling Die Casting Co., Inc., 743 39th

Buffalo

Phoenix Die Casting Co., 21 Illinois

East Syracuse

Syracuse Die Casting & Mfg. Co., 2101 Teall Ave.

Freeport, Long Island

Adept Castings, Inc., 39 Hanse Ave.

Hollis

Ideal Toy Corp., 184-10 Jamaica Ave.

Inwood, Long Island

Long Island Die Casting, Inc., 21 Smith

Jamestown

Chautauqua Hardware Corp., 31 Water

Lakewood

Falconer Metal Specialty Co., Inc., Fairmont Ave.

Long Island City

E. B. Metal Products Co., 12-12 Bridge Plaza, S.
Starlight Specialties Inc., 22-14 40th

Massapequa

Master Fabricators, Inc., 6 Brooklyn

Mt. Vernon

General Metals Corp., 444 S. Ninth
Gorton & MacIntyre, 55 South Third

Newburgh

Eastern Malleable Iron Co., Eastern Casting Corp. Div., 64 S. William
Hudson Valley Aluminum Co., Inc., Box 506

New Hyde Park, L. I.

Hamilton Diecasting Corp., 2020 Jericho Turnpike
Monarch Tool & Machine Corp., 1847 Highland Ave.

New Rochelle

Gries Reproducer Corp., 140 Beechwood Ave.

New York

Darmon Tool & Mfg. Corp., 2664 Park
Mark Kenny Products Co., Inc., 251 E. 137 St.
Metal-X Specialties Co., Inc., 5 E. Third
Sherman Pressure Casting Corp., 601 W. 26
Stricker Brunhuber Corp., 1915 24th

Oswego

Oswego Casting Corp., Box 222

Poughkeepsie

DeLaval Separator Co., 25 Columbia

Richmond Hill

Comet Metal Products Co., Inc., 132 Street & 91st Ave.

Syracuse

Ainsworth-Precision Castings Co., Div. of Harsco Corp., P. O. Drawer 1077

West Islip, L. I.

Seaboard Diecasting Corp., 1125 Prospect Ave.

Woodside

Allen-Stevens Corp., 33-53 62nd St.

NORTH CAROLINA

Reidsville

Dixie Die Casting Corp., Box 1208

OHIO

Bedford

Manor Die Cast Corp., P. O. Box 386

Bedford Heights

Lester Castings, Inc., 25661 Cannon

Berea

Mohawk Foundries, Inc., 55 First St.

Canton

Frantz Mfg. Co., 1200 Camden Ave., S.W.

Cincinnati

Cincinnati Die Casting Co., The, 2117 Spring Grove Ave.
Electric Auto-Lite Co., The, Lamp Div.
Varland Metal Service, Inc., 1350 Arlington

Cleveland

Accurate Die Casting Co., The, 3089 E. 80
Ainsworth-Precision Castings Co., Div. of Harsco Corp., 12600 Berea Rd.
Arrow Aluminum Casting Co., 3135 Berea Rd.
Basic Aluminum Casting Co., 1325 E. 168
Edward W. Daniel Co., 4050 St. Clair
Die Cast Products, Inc., 4040 Hough
R. H. Eggers Co., 4701 Perkins Ave.
Empire Die Casting Co., 19800 Miles
Halex Die Casting Co., 8640 Bessemer
Monarch Aluminum Mfg. Co., 9205 Detroit Ave.
H. K. Porter Company, Inc., Cleveland Division, 45 18 Lakeside Ave.
H. K. Porter Co., Inc., Cleveland Div., 3270 E. 79th St.
Pressure Castings, Inc., 21500 St. Clair Ave.
Superior Die Casting Co., The, 1001 London Rd.
Thompson Products, Inc., Light Metals Div., 2269 Ashland Rd.
Tool-Die Engineering Co., The, 9210 Loren Ave.

Columbus

Ohio Die Casting Corp., 266 E. Fifth

Conneaut

Conneaut Die Casting, 618 Sandusky

Cuyahoga Falls

Akron Presform Mold Co., The, 2038 Main

Dayton

Acme Die Casting Co., Inc., 746 Albany
Dayton Die Casting Co., 111 Front,
Yoder Die Casting Corp., 727 Kiser

Euclid

Laco Die Casting Company, 23440 Lakeland Blvd.
Nelmor Mfg. Corp., 26420 Lakeland Blvd.

Ft. Recovery

Superba Die Castings, Box 147

Germantown

Atlas Die Casting Co., 362 N. Kelley

Hamilton

Hamilton Die Cast Inc., 240 North "B"
Techni-Cast Corp., 600-608 Walnut

Marysville

Ray Lewis & Son, Inc., Delaware Rd.

New Vienna

Wells Mfg. Co., Inc.

North Canton

Helfrich Die Casting Co., 208 Schneider Rd.
Hoover Co., The, Die Casting Div.

Toledo

Hilfinger Corp., 1800 Westwood Ave.
National Lead Co., Doehler-Jarvis Div., Dixie Hwy. & Willamont Rd.
National Lead Co., Doehler-Jarvis Div., Dixie 2100 Smead Ave.
Schultz Die Casting Co., 1810 Clinton

OKLAHOMA

Oklahoma City

Little Giant Pump Co., 5101 Classen Blvd., Box 9545

Tulsa

Ajax Die Casting & Mfg. Co., 2002 E. 6 St.

OREGON

Eugene

Irrigation Equipment Co., 1300 Bethel

Medford

Kadee Metal Products Co., 720 S. Grape

Portland

Future Products Co., 3625 N. Mississippi Ave.
Power Brake Equipment Co., 1632 S.E. 11 Ave.
Product Engineering Co., 4707 S. E. 17

PENNSYLVANIA

Altoona

Veeder-Root Inc., P. O. Box 1591, 6th Ave. Rd. at Burns Ave.

Athens

J & F Tool & Die Casting Corp., P. O Box 175

Bellefonte

Titan Metal Mfg. Co.

Erie

Parker White Metal Co., 2153 McKinley Ave.

Herminie

Auel Industries

Lancaster

Reese Padlock Co., 128 Sherman

Latrobe

Latrobe Die Casting Co., Unity St.

Lehighton

Blue Ridge Pressure Castings, Inc., Bridge St.

Penndel

Products Eng. & Mfg. Corp., Noeland

Philadelphia

John D. Carey Co., 2194-96 Bridge St.
La France Precision Casting Co., 29th & McKean Sts.
Super Grip Anchor Bolt Co., Inc., 3333 N. 22

Pittsburgh

Wessel Hardware Corp., 919-31 N. 5th
General Cast Products, Inc., 2211 Waverly St., Swissvale

Point Marion

Almar Metal Arts, 1 Water Street

Pottstown

National Lead Co., Doehler-Jarvis Div.

Scranton

Continental Metallifacture Co., 414 Pine

Swissvale

Pittsburgh Die & Casting Co., 7503 Ardmore St.

Telford

Pierson Machine Co., R.D. #2

Womelsdorf

Marco Industries, Inc., 3rd & Franklin Streets

RHODE ISLAND

Pawtucket

Production Specialties Co., 185 Water

TENNESSEE

Columbia

Columbia Metal Products Inc., Box 544

Memphis

Rollin Wilson Co., The, 1213 Empire

TEXAS

Amarillo

Pyramid Corporation, 915 Cleveland

Austin

Hall Level & Mfg. Wks., 1119 E. 4th St., P. O. Box 1101

Corpus Christi

Roberts Engineering & Mfg. Co., Inc. 640 Navigation Blvd., Box 4060

Dallas

Dallas Die-Casting Co., 316 Rock Island

Fort Worth

Fort Worth Die Casting Co., Inc. 1213 E. Daggett
R. W. Hughes Industries, Inc., 2713 Ludelle
Molded Products Co. Inc., 2820 N. Sylvania, Box 7281

Houston

Production Die Casting Co., 6502 Rusk Ave.

San Marcos

Procter Metal Products, P. O. Box 696

WASHINGTON

Seattle

Quality Diecasters, 13714 — 37th N. E.

WISCONSIN

Cedarburg

Meta-Mold Aluminum Co., Sub. of The Dayton Malleable Iron Co.
Scherer Mfg. Co., Alyce Ave.

Madison

Madison-Kipp Corp., 213 Waubesa
Reuhl Products, Inc., 4505 W. Beltline Hwy.

Milwaukee

Advance Tool & Die Casting Co., 3760 N. Holton
Badger Die Casting Corp., 201 W. Oklahoma Ave.
Midwest Die Casting Co., 3930 N. First
Milwaukee Die Casting Co., 4132 N. Holton
J. W. Speaker Corp., 3059 N. Weil
Stroh Die Casting Co., Inc., 11123 W. Burleigh

Racine

Acme Die Casting Corp., 1635 Murray Ave.
Racine Die Casting Co., 1500 16th

CANADA

Aluminum Co. of Canada Ltd., Castings Div., 15 Brown's Line, Toronto, Ont., Canada
Automotive Accessory Co., Ltd., 1551 Erin St., Winnipeg Man., Canada
Banner Metal Products Ltd., 1680 Kildare Rd., Windsor, Ont., Canada
Barber Die Casting Co., Ltd., Postal Station "B", Box 240, Hamilton, Ont., Canada
Carpenter Die Casting Co. Ltd., 474 Burlington St., E., Hamilton, Ont.,
Dominion Die Casting Ltd., Heinz St., Wallaceburg, Ont., Canada
Gordon Mfg. Co. Ltd., 1390 Wallace, Wallaceburg, Ont., Canada
Lakeshore Die Casting Ltd., 482 Queen Elizabeth Way, Oakville, Ont., Canada
Mendler Mfg. Co., P. O. Box 125, Sandwich Postal Station, Windsor, Ont., Canada
National Hardware Specialties Ltd., Box 250 Dresden, Ont., Canada
Ontario Steel Products Co. Ltd., Die Casting Div., St. George St., Chatham, Ont., Canada
A. O. Pope Ltd., 90 Winter, Saint John, N. B., Canada
Pressure Casting Of Canada Ltd., 67 Main St., S., Weston, Toronto 15, Ont., Canada
Richmond Machine Tool & Die Casting Co. Ltd., 5680 Fullum Street, Montreal, Que., Canada
Schultz Die Casting Co. of Canada Ltd., Wallaceburg, Ont., Canada
White Die Casting Co., Monad St. at Head, Dundas, Ont., Canada

TRADE MARK DIRECTORY

A & A Die Casting Co.

ABCO Die Casting Corp.

Accurate Die Casting Co., The

Adept Castings, Inc.

Admiral Die Castings

Advance Pressure Castings, Inc.

Advance Tool & Die Casting Co.

Ainsworth-Precision Casting Co., Div. of Harsco Corp.

Ainsworth-Precision Casting Co., Div. of Harsco Corp.

Ainsworth-Precision Casting Co., Div. of Harsco Corp.

Ainsworth-Precision Casting Co., Div. of Harsco Corp.

Allen-Stevens Corp.

Allmetal Diecast Company

Alloy Die Casting Co.

Alpha Industries

Alumiloy Fabricators, Inc.

Aluminum Company of America

Aluminum Die Casting Co.

Ambrit Industries, Inc.

American Aluminum Casting Co.

American Die Casting Co.

Amerock Corporation

Anderson Die Casting & Engineering Co.

Arrow-Acme Corp.

Atlantic Die Casting Co.

Atlas Die Casting Co.

Atomic Die Casting Corp.

Aurora Metal Co.

Automotive Accessory Co., Ltd.

Badger Die Casting Corp.

Barber Die Casting Co. Ltd.

Basic Aluminum Casting Co.

Bendix Foundries

Benton Harbor Malleable Industries, Inc.

Blue Ridge Pressure Castings, Inc.

Bruin Mfg. Co.

Buehrle Engineering Co.

Calko Die Casting Co.

Callen Mfg. Corp.

John J. Carey Co.

Carpenter Die Casting Co. Ltd.

Central Die Casting & Mfg. Co., Inc.

Century Die Casting Co.

Char-Lynn Co.

Chicago White Metal Casting, Inc.

Cincinnati Die Casting Co., The

Clinton Machine Co.

Clyde Equipment Co.

Coast Die Casting Co.

Comet Metal Products Co., Inc.

Conneaut Die Casting Company

Consolidated Die Cast Corporation of America

Continental Die Casting Corp.

Robert A. Cox Die Casting Co.

Crown City Die Casting Co.

Edward W. Daniel Co.

DeLaval Separator Co.

Delta Die Casting Corp.

Denham Mfg. Co.

Detroit Die Casting Corp.

Die Cast Products, Inc.

Diecasters, Inc.

Dieco Die Casting Corp.

Dixie Die Casting Corp.

Dollin Corp.

Dominion Die Casting Ltd.

Dow Chemical Co., The

Dow Chemical Co., The

Duane Specialties, Ltd.

DuPage Die Casting & Fabricating Co., Inc.

Du-Wel Metal Products, Inc.

Eastern Malleable Iron Co., Eastern Casting Corp. Div.

Electric Auto-Lite Co., The, Lamp Div.

Electric Auto-Lite Co., The, Woodstock Div.

El Monte Tool & Die Casting, Inc.

Empire Die Casting Co.

Exact Tool & Die Co.

Falconer Metal Specialty Co., Inc.

Federal Die Casting Co.

Fort Die Casting Corp.

Fort Worth Die Casting Co., Inc.

Frantz Mfg. Co.

Future Products Co.

General Die Casting Co.

General Motors Corp., AC Spark Plug Div.

General Motors Corp., Fabricast Div.

Gibbs Automatic Moulding Corp.

Grand Die Casting, Inc.

Grand Rapids Brass Co.

Grand Rapids Die Casting Co.

Grand Steel & Mfg. Co.

Great American Plastics Co.

C. M. Grey Industries Inc.

Gries Reproducer Corp.

Gries Reproducer Corp.

H & M Industries, Inc.

Hadlock & Temte, Inc.

Halex Die Casting Co.

Hamilton Diecasting Corporation

Hamilton Die Cast Inc.

Hamlin Products, Inc.

Hampden Brass & Aluminum Co.

Harvill Corp.

Harvill Corp.

Heick Die Casting Corp.

Helfrich Die Casting Co.

Hilfinger Corp.

Holland Die Casting Co., Inc.

Hoover Co., The

Huid Lock & Mfg. Co.

Industrial Die Casting Co.

Irrigation Equipment Co.

Jervis Corp.

Kadee Metal Products Co.

Kalamazoo Die Casting Co.

Kaljer Mfg. Co. Div. of Jervis Corp.

Kamin Die Casting & Mfg. Co.

Kent Castings Corp.

Kiowa Corp.

Paul Krone Die Casting Co.

Kuhlman Diecasting Co.

Kwikset Locks, Inc.

Laboratory Equipment Corp.

Lakeshore Die Casting Ltd.

Latrobe Die Casting Co.

Leco Plating Co.

Lee Silver Service, Inc.

Lester Castings, Inc.

Lincoln Die Casting, Inc.

Litemetal Dicast, Inc.

Littler Diecast Corp.

Lloyd Products, Inc.

Los Angeles Die Casting Co.

Lyons Diecasting Co.

Madison-Kipp Corp.

Magnesium Industries, Inc.

Manger Die Casting Co., Inc.

Manor Die Cast Corp.

L. E. Mason Co.

Metro Casting Co., Inc.

Midwest Die Casting Co.

Mid-Western Die Casting Co.

Milwaukee Die Casting Co.

Missouri Diecasting Co.

Monarch Aluminum Mfg. Co.

Monarch Aluminum Mfg. Co.

Monarch Governor Co.

Monroe City Diecasting Co.

Mt. Vernon Die Casting Corp.

National Hardware Specialties Ltd.

National Lead Co. Doehler-Jarvis Div.

National Lock Co.

Nelson Metal Products, Inc.

New England Die Casting Co., Inc.

New Products Corp.

Newton-New Haven Co., The

Nordon Die Casting Co., Inc.

Norgren-Stemac, Inc.

Norwood Tool & Machine Co.

Ohio Die Casting Corp.

Ontario Steel Products Co. Ltd.

Oswego Castings Corp.

Pabcast

Page & Hall Mfg. Co., Inc.

Paragon Die Casting Co.

Paramount Die Casting Co.

Parker White Metal Co.

Peat Mfg. Co.

Peerless Aluminum Foundry Co., Inc. Peerless Die Casting & Permold Div.

Petosky Mfg. Co.

Phoenix Die Casting Co.

Pioneer DieCasters, Inc.

Pittsburgh Die & Casting Co.

A. O. Pope Ltd.

H. K. Porter Co., Cleveland Div.

Premier Die Casting Co.

Pressure Castings, Inc.

Pressure Castings of Canada Ltd.

Product Engineering & Mfg. Corp.

Production Die Casting Co.

Racine Die Casting Co.

Rangers Die Casting Co., Inc.

Republic Die Casting Co.

Richmond Machine Tool & Die Casting Co. Ltd.

Rowe Plastics & Die Casting Co.

Rupert Diecasting Co.

S-K-S Die Casting Co.

S.U.S. Die Casting Co., Inc.

Saginaw Bay Industries, Inc.

St. Louis Diecasting Corp.

San Jose Die Casting Corp.

Scherer Mfg. Co.

Schultz Die Casting Co.

Schultz Die Casting Co. of Canada Ltd.

Seaboard Diecasting Corp.

Sherman Pressure Casting Corp.

sMc Soper Mfg. Co.

Stella Products Corp.

Sterling Aluminum Products, Inc.

Sterling Die Casting Co., Inc.

Stewart-Warner Corp., Stewart Die Casting Div.

Stroh Die Casting Co., Inc.

Superior Die Casting Co., The

Super Grip Anchor Bolt Co., Inc.

Syracuse Die Casting & Mfg. Co.

T Die Cast & Molded Products

Tann Corp., Congress Die Casting Div.

Techni-Cast Corp.

Thompson Products, Inc., Light Metals Div.

Titan Metal Mfg. Co.

E. Toman & Co.

Tool-Die Engineering Co., The

Tri-State Die Casting Corp.

Twin City Die Castings Co.

Twin City Die Castings Co.

Union Die Casting Co.

Univex Die Cast & Engineering Co.

Van Wey Die Casting & Tool Co.

Veeder-Root Inc.

Wells Die Casting Co. of California

West Irving Die Casting Co.

Western Die Casting Co.

Westland Die Casting, Div. of Westland Tool & Mfg. Co.

Wheaton Die Casting Corp.

White Die Casting Co.

Withrow Die Casting Co.

Wolverine Die Cast Corp.

Yoder Die Casting Corp.

Zenith Diecasting, Inc.

ABOUT THIS DIRECTORY. . .

In this issue, we present the second published directory of the jobbing die casters. The basis for all listings has been the information supplied by the individual die casters. Only those die casters who returned PRECISION METAL MOLDING'S questionnaire and who gave full information have been included. The requirements for listing in the directory prevented the inclusion of many known die casting companies since they failed to return a questionnaire.

Key to Listings:

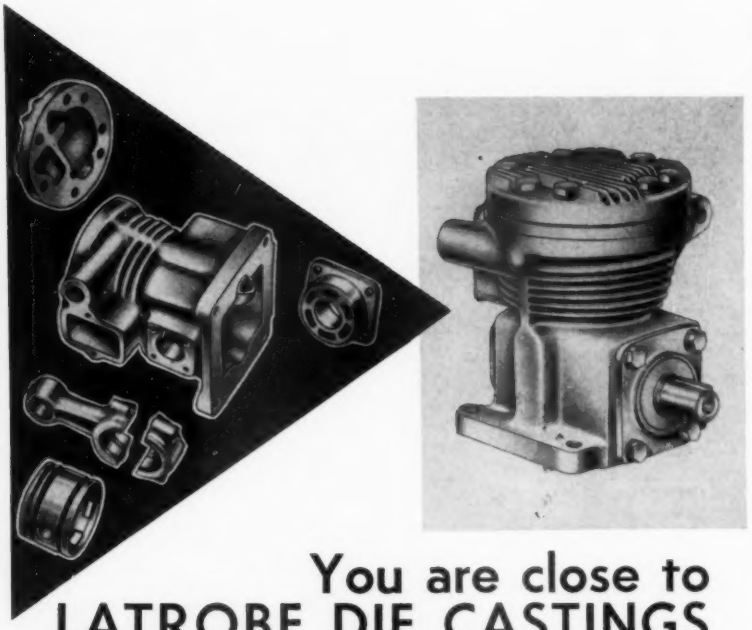
Metals (A) Aluminum, (B) Copper-base, (C) Magnesium, (D) Zinc, (E) Lead and (F) Tin; **Facilities** at the same address (1) Assembling, (2) Die Making, (3) Electro-plating, (4) Heat Treating, (5) Machining, and (6) Painting.

A single asterisk (*) after a company name indicates membership in the American Die Casting Institute. A double asterisk (**) indicates that the company is a participant in the ADCI's Certified Zinc Alloy Plan.

Complete addresses for die casters are given in both the alphabetical and geographical listings, but additional information such as metals cast and facilities available are included only in the alphabetical list.

Bold faced listings indicate advertisers in this Directory Issue of PRECISION METAL MOLDING. For additional information about these companies, consult the Index of Advertisers beginning on page 137.

Additional copies of this directory are available at the following prices. 1 to 10 copies — $1.00 each; 11-25 copies — 85¢ each; over 25 copies 75¢ each.



You are close to LATROBE DIE CASTINGS when you ride on air in many of the new 1958 automobiles

Six Latrobe aluminum die castings shown above go into the Bendix-Westinghouse compressor assembly which supplies the air for modern air suspension systems in many 1958 automobiles. After extensive research, development and testing of sand cast models to perfect the functional design, Bendix-Westinghouse chose Latrobe die castings for the production job.

You are close to LATROBE DIE CASTINGS when you design your products

Your products, too, can benefit by the close cooperation of Latrobe Die Casting Company's engineers, all the way from initial design through the completed die castings. You'll get top quality and workmanship, along with fast service when you call Latrobe.

LATROBE DIE CASTING CO.

Latrobe, Pa. — Established 1918

Die Castings in Aluminum, Zinc, Tin and Lead Alloys

LATROBE DIE-CASTING CO.
Latrobe, Pa.

Gentlemen: To help in planning our die castings, we would appreciate getting from you (without obligation, of course) the following . . .

..... More information about your facilities and services
..... Die casting design assistance
..... Price quotation on the attached print

Name .....
Title .....
Company .....
Addess .....
.....

For more information circle No. 79 on the Reader Service Card

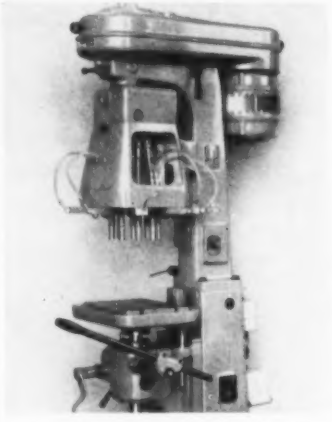
NEW PRODUCTS—
continued from page 86

ers, varnishes, phenolic, long oil, die drawing compound, metallics, sealers, primers, and other materials, has been announced by Aro Equipment Corp.

Items in the line include a 4:1 ratio divorced type paint spraying unit in 50 lb. capacity portable units and 400 lb. stationary pumps; 2:1 ratio portable and stationary paint units for production use; a 1:1 ratio paint transfer pump for transfer of paints, lacquers and thinners; multi-purpose spray stations; production line circulating systems, and paint pump and air line accessories.

Circle No. 217 on Reader Service Card

DRILLING-TAPPING MACHINE IS MULTI-SPINDLE



A new multi-spindle drilling-tapping machine features spindles that can be fixed in any position; circles, straight lines, or irregularly. With this machine, introduced by Aaron Machinery Co., it is possible to rotate the spindles at different speed ranges. Two different speed rotations can be attained simultaneously by coupling different pairs of speed ranges.

Circle No. 221 on Reader Service Card

ECONOMICAL DEGASSING OF STEEL

. . . by pouring into a vacuum

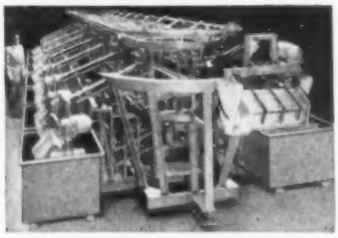
Mr. K. C. Taylor, a vacuum degassing specialist on the staff of F. J. Stokes Corp., reported to the Metallurgical Congress that the refinement of steel in tonnage quantities by pouring it in a sustained stream into a vacuum chamber, thereby removing dissolved gases and evaporating other contaminants, is now a practical and economical procedure.

Vacuum stream degassing provides increased yields of usable metal, and steel which is gas-free and more ductile, hence is more easily machined or forged than that made by normal atmospheric pouring. These advantages offset the moderate extra cost.

Information on vacuum stream degassing equipment, designed and engineered by the Stokes Co., that has successfully degassed a 250-ton heat of alloy steel, is available with information on the process.

Circle No. 220 on Reader Service Card

BARREL PLATER . . . is automatic



Features of this automatic barrel plating machine are uniform distribution of electroplating deposit and increased output at reduced cost.

Manufactured by Belke Mfg. Co., the machine uses horizontal plating cylinders with a hanger mounted motor drive. Easy to change cylinders of different types can be used. The standard machine has 18 cylinder stations, including 5 plating tank positions. With a 20 minute plating period, the unit will turn out a completed cylinder every 4 minutes.

Circle No. 227 on Reader Service Card

NEW BURR-BIT . . . taps and de-burrs in one operation

Burr-Bit is a new device that taps and de-burrs in one operation by simply slipping over a two or four fluted Heli-Coil tap.

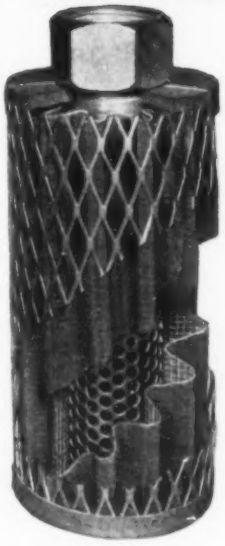
When the tap is withdrawn from the work piece, the burr-bit operates leaving the top of the hole perfectly smooth and clean. The bit can be used with conventional tapping machines or with tapping heads.

Manufactured by Vernon Devices, Inc., the bit is available in sizes #4 (.04CSB) to 3/8" (20145-6).

Circle No. 224 on Reader Service Card

Continued on next page

MARVEL Synclinal FILTERS



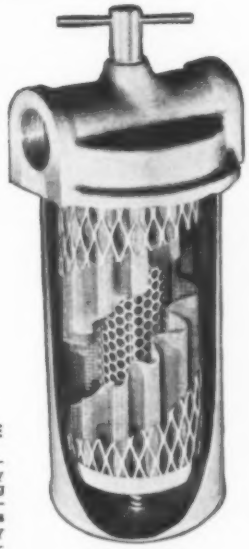
SUMP TYPE (cutaway)

For Efficient Filtration of—

Hydraulic Oils—
Fire Resistant Hydraulic Fluids—
Coolants — Lubricants —
Water

OVER 800
Original Equipment Manufacturers Install Marvel Synclinal Filters as Standard Equipment

Meet J.I.C. Standards



LINE TYPE (cutaway)

PROTECT EQUIPMENT
INCREASE PRODUCTION
REDUCE MAINTENANCE

Marvel Synclinal Filters installed in the sump or on the line preceding pump offer maximum protection on all hydraulically actuated and other equipment utilizing low pressure circulating oil systems. Maintenance and production costs are reduced because MARVEL Synclinal Filters BALANCED design offers greater ACTIVE filtering area with sufficient storage capacity for filtered out damaging particles, thus, longer periods of productive operation are attained at minimum "down time" due to maintenance and repairs.

PRODUCTION ENGINEERS and MAINTENANCE MEN whose job it is to keep production machinery operating at peak efficiency and who have recognized the superiority of Marvel Synclinal Filters in the filtration of hydraulic oils, fire resistant hydraulic fluids, coolants, lubricants, etc. are specifying Marvel Synclinal Filters on all new equipment and standardizing with Marvel Synclinal Filters on all machines within their plants.

Another outstanding reason for their preference is the simple construction of Marvel Synclinal Filters which allows them to be easily disassembled, thoroughly cleaned and reassembled on the spot, by any workman in a matter of minutes. Line type operates in any position and may be serviced without disturbing pipe connections.

A SIZE FOR EVERY NEED

Available for sump or line installation in capacities from 5 to 100 G.P.M. Greater capacities may be attained by multiple installation (as described in catalog.) Choice of Monel mesh sizes range from coarse 30 to fine 200.

IMMEDIATE DELIVERY!

As in the past, Marvel continues to offer Immediate Delivery!

Catalogs containing complete data available on request

MARVEL ENGINEERING COMPANY
7227 N. HAMLIN AVE.,
CHICAGO 45, ILLINOIS
Phone: JUNIPER 8-6023

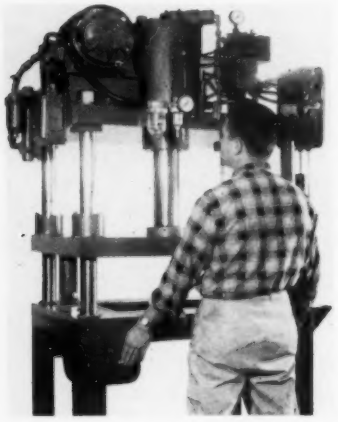
PMM-1

Without obligation, please send me complete data on Marvel Synclinal Filters, as indicated:—

- ☐ Catalog #100—For Hydraulic Oils, Coolants, Lubricants
- ☐ Catalog #200—For Fire-resistant Hydraulic Fluids (Aqueous Base)
- ☐ Catalog #400—For Fire-resistant Hydraulic Fluids (Synthetic)
- ☐ Catalog #301—For Water

Name .....
Company .....
Address .....
City .....
State .....

NEW TRIM PRESSES
. . . are fast acting



New, fast-acting, hydraulic trim presses have been announced by the Bausenbach Hydraulics Div., Buffalo Metal Container Corp. These heavy-duty, fast acting, high velocity, hydraulic trim-presses are designed around a new principal which uses an accumulator with a closed shock-free, pressurized system.

Rapid cycling action is achieved with lower horsepower input. Broader production capacities are provided with approach speeds up to 2000 I.P.M. ram travel. Presses are available in platen sizes of 15″ x 18″ up to 36″ x 54″, offering 12″, 15″, and 18″ strokes, with shut-heights of 5″, 10″ and 15″, in 13, 20, 30, 40 and 50 ton capacities, in either 2 or 4 post types.

Circle No. 228 on Reader Service Card

CUSTOM-MADE MUFFLES FOR SINTERING FURNACES

Muffles that withstand high temperatures and strong atmospheric conditions in sintering furnaces, have been introduced by Wiretex Mfg. Co.

Custom-made, these muffles are available in a number of alloys, including the preferred Inconel, Incoloy and Type #330. Thicknesses range upward from ¼″, with oversize crown tops. The muffles have extremely high capacity for holding shape in expansion and contraction. They are available with extra braces of flat bar stock. Weldments are double secured with strict adherence to specifications.

Circle No. 230 on Reader Service Card

PARTICLE COUNTER
. . . for content & size distribution

An instrument that counts and sizes 100,000 fine particles in 15 seconds has been developed by Coulter Electronics. This electronic unit, which has application for nearly any particle in the 0 to 200 micron range, requires 5 to 10 minutes for an average size-frequency determination.

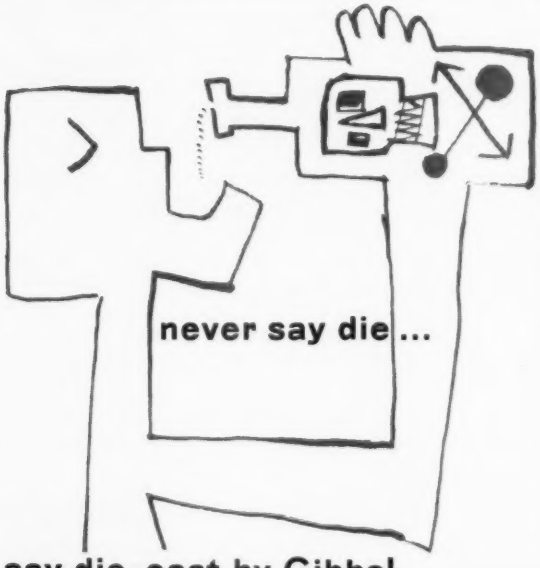
The principle involves the forced passage of a fluid suspension of particles through a small aperture having an electrode on each side. As a particle passes through, aperture resistance changes in proportion to particle size, and the resultant series of electrical pulses is electronically scaled and counted.

It is possible to measure any type of particle if the suspending medium is an electrical conductor. Apertures from 35 to 400 microns are available for counting particles ranging in size from 0.7 to 200 microns. Size ranges of 20 to 1 are easily handled.

The unit has a moderately wide field of application in both the investment casting and powder metal industries.

Circle No. 222 on Reader Service Card

Continued on page 133



say die-cast by Gibbs!

Your business slowly being poisoned by improper tolerances? Try Gibbs for tranquilizing service. Automatic, more accurate, faster production of zinc casting to 10 pounds, aluminum to 5 pounds. Everything you need under one roof including tool room, machining, plating, painting and assembly.

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For more information circle No. 60 on the Reader Service Card

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SLASHED SMALL PARTS COSTS MORE THAN **50%**

This latching cam WAS a 3-piece unit that cost $4.946, completely machined and assembled. Now, it IS a single OPC Manganese Bronze casting that costs just $2.410, completely finished. And each casting is individually checked to make certain the sprocket tooth form fits perfectly into a #40 standard roller chain.

An astute buyer and a knowledgeable OPC man worked together to affect this tremendous saving on small parts for S & C Electric Company. An equally astute buyer could call in the OPC man and quite likely make equally substantial savings on your small parts.

For a start, write for our illustrated brochure that contains many other examples of cost-cutting with OPC castings.

OPC **OHIO PRECISION CASTINGS, INC.**
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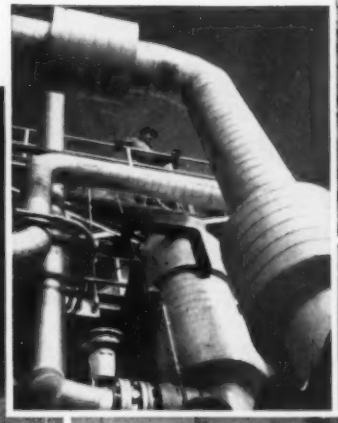
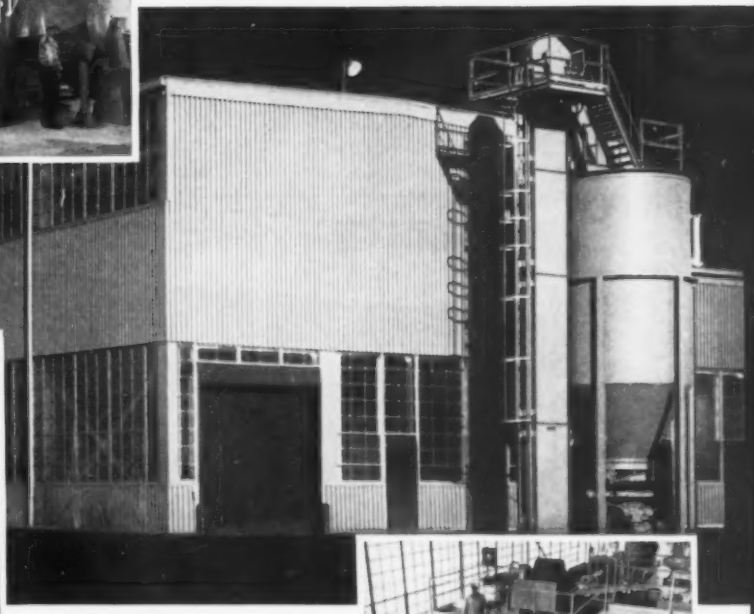
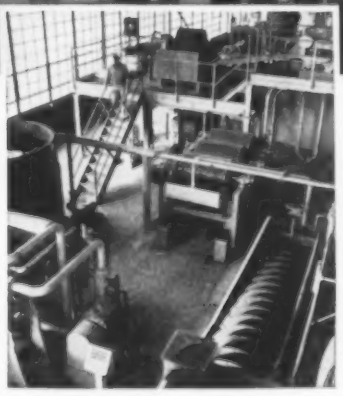
Plaster Mold Castings made from
BRASS • BRONZE • ALUMINUM • BERYLLIUM COPPER

For more information circle No. 99 on the Reader Service Card







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that produces iron powders with predictable dimensional control after sintering

THIS IS THE PLANT, strategically located in Toledo, Ohio, where Republic produces high quality iron powders for the molding and manufacture of mechanical parts. This is the plant where Republic developed its exclusive *Controlled Dimensional Factor* process.

THIS IS THE PROCESS that provides benefits for everyone concerned with the production of iron powder sinterings—tool engineer, designer, fabricator. CDF is the process that permits accurate prediction on what the dimensional characteristics of iron powder will be after sintering. The process that eliminates the element of uncertainty in powder reaction, before a tool or part is designed, before a production run is started.

THIS IS THE SERVICE Republic offers—field, mill and laboratory metallurgists, who combine their experience and knowledge with the skills of your own engineering and designing staffs in working out profitable solutions to problems you may encounter in the design and fabrication of sinterings. This service is obligation-free and confidential.

FREE BOOK contains complete information on test evaluations, chemical composition and physical properties of Republic CDF Iron Powders. Mail coupon for your copy; or for metallurgical service.

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Company_____

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City_____ Zone____ State_____

LANGENHEIM

continued from page 45

Q: What is your role in the development and application of investment castings in missiles and aircraft?

A: Our function is to try and get aircraft people to design castings properly so that they take full advantage of the casting process, and to get foundry people to work on a higher plane. For example, a foundry can get by with a draft of one degree on a casting, if necessary. In contrast, a draft of seven degrees is needed on a forging.

Q: What is holding development back?

A: There is a definite need for *new thinking and new attitudes.* At the present time, many missile and aircraft people are indoctrinated with the "heavy-press" program. They just don't realize the great usefulness of castings. And because of this, a lot of *needless machining* is being done on missile and aircraft parts.

Q: How did this lack of understanding come about between aircraft people and the foundries?

A: It began during World War Two. Air frame people became alarmed because they could not get consistent quality in the castings they were buying.

Q: Why was this?

A: Because the foundry people were used to making agricultural machinery, large railroad building equipment, and other heavy-duty castings.

Q: And how did the foundry people feel?

A: They were just as discouraged because the aircraft people were not flexible in their design ideas. They insisted that, once a thing was drawn and specified, it could only be made in that specific way.

Q: Was this attitude of the aircraft people unjust?

A: Yes. Often, they would lay something out on a piece of paper and say, "You can't change it." Yet, many times it was found later that changes could have been made that would have made a casting possible.

Q: And has this situation improved?

A: Oh yes. But there is still a lot of room for improvement before proper castings can be developed for missiles and aircraft.

Q: And for the last question: Can you make a prediction for us?

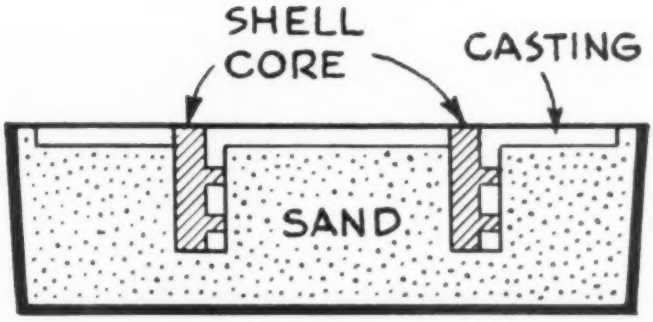
A: I foresee an increase in the use of investment castings in missiles and military aircraft as fast as new materials and improved foundry techniques and practices develop. Newer aircraft and missiles that operate at higher speeds and temperatures will need materials with much greater strength and heat resistant properties than are being used now.

It is highly probable, because of this, that precision castings will be needed in greater and greater numbers.

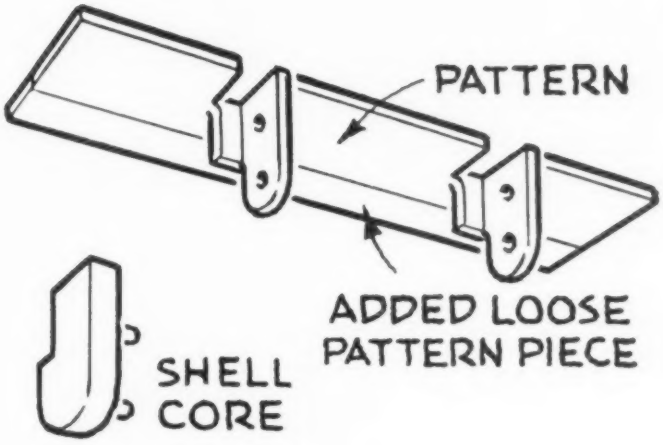
As the investment casting industry shows its ability to produce larger castings, at lower over-all cost, the demand for these castings should improve.

The potential use of investment castings in missiles and aircraft is of extreme importance. This is the first of several, separate articles scheduled for future publication in PMM Magazine. Each will be based on a different, important aspect of the subject: Investment Castings in Aircraft. — The Editors.

For more information circle No. 26 on the Reader Service Card



CUTAWAY ELEVATION:
ENTIRE PIECE IN DRAG.



SHELL CORES were used in the drag half of the sand mold as shown in the top figure. To produce deeper rakes the loose pattern piece shown in the center was used. The shell core, bottom, forms the inside face of the flange, the stringer slot and the bolt holes. Tolerances are close enough so no machining is required.

RAKE DESIGN

continued from page 55

3. Cored bolt holes, 11/16″ diameter, were to be smooth and held to ±0.010″ O.C.
4. Stringer slots were to be held to ±0.025″ location tolerance.
5. The number of different patterns had to be kept low.

The last requirement was necessary even though there was a single basic design. The depth of the blade, i.e. the distance from its top edge to the tank bottom, varied, depending on the size of the classifier. This difficulty was overcome by the use of a loose pattern piece which would bring the rake to the required depth.

Each rake blade was cast in a green sand mold with two cores. These 1″ thick, resin-bonded cores were capable of holding tolerances to ±0.010, and performed three functions in the critical areas of the casting.

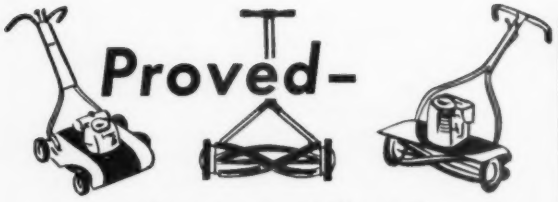
1. The top, flat surface of the core formed the smooth inside face of the bracket.
2. The end surface formed the slot for the stringer.
3. A pair of cylindrical projections from the top surface formed the properly positioned bolt holes.

The outer, less critical, blade areas were formed in green sand.

With the new castings all requirements were met and no subsequent machining was necessary.

The distance between bolt holes was accurate, the surfaces were smooth and the rake blades were straighter than the blades previously used for similar service.

A further saving resulted by designing the rake so that only one pattern was required. By reversing the blade, during assembly, four bolts support two rakes.



Proved–

the Long-Life of Light Metal Die Castings in Power and Hand Mowers

More and more manufacturers of hand operated and power driven, rotary and reel-type, Lawn Mowers are using components, such as shown in the photograph, of die cast aluminum and magnesium. These applications of aluminum and magnesium die cast parts have proved themselves through years of operating experiences. For example: one die cast gear, such as shown in the upper right hand corner, has been used continuously for 10 years. During that time 1,500,000 lawn mowers have been equipped with these gears . . . surely proof of long-life and satisfaction to both the manufacturer and ultimate consumer.

Important production cost savings are effected also through the minimizing or virtual elimination of machining operations, plus the providing of smooth surfaces and design flexibility. Too, shipping costs are reduced due to the lighter weight of these aluminum or magnesium die cast parts. In addition to the gear referred to, the illustration above also includes: wheels, gears, gear housings, shaft housings, brackets, spacers, frames, cutter bar supports, etc.

Let's Talk It Over . . .

LITEMETAL DICAST, INC. is an organization of specialists — men thoroughly experienced in the casting and machining of magnesium and aluminum alloys. Our equipment includes big machines for big jobs — little machines for little jobs . . . the right sizes and types of the most modern die casting equipment for producing parts from the size of a button to large cable spools. Complete facilities for secondary operations are also available.

Write today for literature and design information. Quick action on inquiries.

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4 INSPECTED THREE TIMES to assure you of only the finest workmanship and soundness in every detail.

Fast delivery in all sizes and styles. Also available: Ingot Molds, Utility Castings, Goosenecks. For details, write Dept. PM-1.

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NEWS OF INDUSTRY & ASSOCIATIONS

activities of people, companies & groups in the precision metal molding industries

AWARD TO NEW JERSEY ZINC

R. G. Kenly, left, vice president of the New Jersey Zinc Company receives the award certificate from Archer W. P. Trench, publisher, American Metal Market, sponsor of the marketing awards.

The New Jersey Zinc Company's sales promotional activities in the die casting industry received a first prize in the 1957 American Metal Market annual marketing awards. The Company's program was judged best in the copper, lead, zinc category.

A long-time leader in the field of high purity zinc and zinc alloys, New Jersey Zinc's research engineers were responsible for the development of new and improved zinc alloys which have become the most widely used in the fast-growing die casting industry. This industry's production of metal parts for the automotive, electrical, home appliance, television, tool, hardware and toy industries has raised annual consumption of high purity zinc for die casting from 25,000 tons to approximately 400,000 tons in the past 25 years.

The Company's die casting alloy promotional activities have been among the most progressive in the industry. Its extensive advertising in metalworking papers,

Continued on page 117

BARREL FINISHING FORUM

Representatives of the barrel finishing industry met in Cleveland, Ohio on December 9th for a round table discussion of the industry, its nomenclature and its problems.

This meeting, the first of a series sponsored by PRECISION METAL MOLDING, discussed the glossary of terms published last July by PMM, the aim is to develop a common language for barrel finishing so that industry representatives and their customers will be able to talk in a common language.

Further education of the users and prospective users of barrel finishing was also discussed at the meeting. Advances in the controlled finishing of both small and large parts have come faster than they could be absorbed. Materials, methods and equipment are available that the users are not familiar with.

The second meeting of the industry group is scheduled for late March, 1958.

Twenty men, representing more than fifteen companies, met to discuss problems of the barrel finishing industry.

Circle No. 104 on the Reader Service Card

FOR DIE-CASTERS

• LUBRICATES
• CLEANS

BUILT TO LAST

P-W AIR-LUBE SYSTEM

Patent Applied For

• VAPOR IS ADJUSTABLE
• INCOMING AIR IN TANK AGITATES LUBRICANT

Speeds production and eliminates many causes of down-time through effective cleaning and *adjustable* thin-film lubrication of all mold-cavity surfaces.

PROVED IN USE BY PROMINENT DIE-CASTERS

S-W-I-S-H! One pressure whisks mold clean with powerful air jet. S-W-I-S-H! Further pressure on same lever shuts off air and lubricates.

PIERCE-WALLER CO.
KETTERING P.O. BOX 2121A, DAYTON 9, OHIO

N. J. ZINC *(cont.)*

its well-known publication, The Alloy Pot, with a wide circulation among consumers of die castings, its production and use of motion picture films and its participation in the promotion of die casting clinics throughout the country constitute the principal phases of its promotion.

In accepting the award, R. G. Kenly, Vice President, paid tribute to the Company's die casting customers. He stated, "Whatever we have done to merit this award certainly could not have been accomplished without the help of our many friends in the die casting industry who supplied much of the material for our programs".

SWEET WINS OAKITE SERVICE AWARD

Walter C. Sweet, Oakite technical service representative in Minneapolis since 1946, has received the 1957 D. C. Ball Award for Distinguished Oakite Service.

The award, named in honor of the founder of Oakite Products, Inc., pioneer manufacturers of industrial cleaning and related compounds, is given annually to the Oakite representative who "best carries forward with his customers the highest ideals of Oakite service".

Mr. Sweet, who was selected from the company's 227-man field organization, received the award from John A. Carter, president, at Oakite's recent sales conference in Chicago.

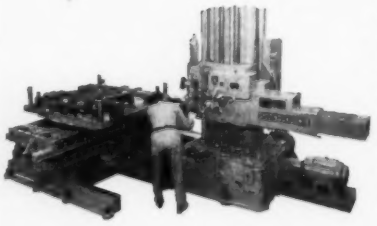
KAISER ALUMINUM TO HUNT BAUXITE

Kaiser Aluminum & Chemical Corporation has obtained a bauxite exploration and mining concession from the Government of Panama, according to D. A. Rhoades, vice president and general manager of Kaiser Aluminum.

The contract is the first bauxite concession ever granted by the Panamanian Government. It gives Kaiser Exploration Company, exclusive exploration and mining rights in a large area of Western Panama near the Costa Rican border. The agreement has been signed by President Ernesto De La Guardia, Jr., and sent to the legislature for approval.

TENNESSEE — *South's Largest Concentration of* TOOL and DIE SHOPS *for Metal Working Industries*

These excellent tool and die facilities make Tennessee an advantageous location for branch plants. Ranging from medium size to firms employing 40 to 100 men, many of these shops can take care of virtually any assignment from building special machines to complete tooling programs including tools, dies, jigs and fixtures, and are handling important projects for large national manufacturers. If you are considering a branch plant in the South, write confidentially for complete information.



For Details, Write:

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Please send details on Tennessee's tool and die industry and other industrial advantages.

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For more information circle No. 120 on the Reader Service Card

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Circle No. 119 on the Reader Service Card

DONOVAN APPOINTED TO BOARD OF H-VM-M

Frank W. Donovan

Frank W. Donovan was appointed to the board of directors of Hanson-Van Winkle-Munning.

Mr. Donovan is a partner of the law firm McClintock, Fulton, Donovan & Waterman in Detroit, Michigan. He is president of Detroit Grand Opera Association and a director of Cleveland Terminal Properties, Inc., Browning Lines, Inc., Thunder Bay Manufacturing Company and Soss Mfg. Company.

Hanson-Van Winkle-Munning Co. was established in 1820 and is one of the oldest firms in the electroplating and anodizing equipment processes field.

KING-SEELEY BUYS QUEEN PRODUCTS

Mr. A. N. Gustine, President of King-Seeley Corporation, of Ann Arbor, Michigan, and Mr. F. A. Trow, President of Queen Products, Inc., of Albert Lea, Minnesota, announced today that arrangements had been concluded for the purchase by King-Seeley of Queen Products and its associated company the Albert Lea Building Corporation.

Queen Products was founded by Mr. Trow in 1921, and control has been in his hands and that of his family since that time. Mr. Trow, now 68, has wished to be relieved of the responsibility of operating his company but has agreed for a period of up to one year to continue to supervise its business as a member of the King-Seeley organization.

INDUSSA OPENS NEW OFFICE AT HOUSTON

J. Poncelet, president of Indussa Corporation, has announced the opening of a new branch office in Houston, Texas. This office will be under the management of William Merckens and will cover the Texas market.

Circle No. 39 on Reader Service Card

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91-07 132nd St. Richmond Hill, N. Y.

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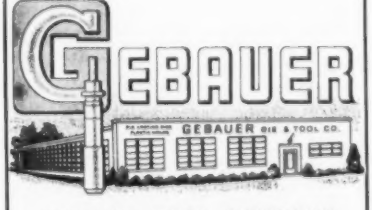

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NON-FERROUS

- CHEMITEX #2 Especially Formulated For Large Castings
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Write today for further information, specifications & prices.

EXCLUSIVE DISTRIBUTORS FOR "WHIP-MIX" CORPORATION.

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For more information circle No. 151 on Reader Service Card

HOME STUDY METALS COURSE

The Metals Engineering Institute, a division of the American Society for Metals, announces that the first in a series of 39 home-study and in-plant training courses is now available to both individuals and industry.

"Elements of Metallurgy" begins with a study of the structure and properties of metals, discusses chemical reactions of metals, and pays special attention to smelting, refractories, refining, and electrolytic processes. Physical aspects of solidification, heat treatment, precipitation hardening, diffusion and surface treatments, and methods of testing round out this broad, basic, up-to-the-minute course — of interest to individuals and technical and administrative personnel.

An instructor assigned to each individual, corrects papers, makes helpful comments, and forwards lessons according to a schedule set by the student himself. MEI guidance and special instructional assistance is also available to industrial groups who wish to use the course as an in-plant or on-the-job training program. Framed certificates are awarded to those who successfully complete the 15-lesson course.

Drawing on the wide resources and contacts of the American Society for Metals, Metals Engineering Institute brings to this program some of the best available talent in the field. Editor for "Elements of Metallurgy" is Ralph E. Edelman, Chief Reactive Metals Section of Pitman-Dunn Laboratories, Frankford Arsenal. Previous to this position he has had experience as Senior Metallurgist, Wright Aeronautical Corporation; Staff Metallurgist at Los Alamos Scientific Laboratories; and as instructor in Metallurgy Extension, Pennsylvania State University.

Associated with him are:

Mr. Paul R. Brucker, Metallurgist, Crucible Steel Company of America

Mr. Edward D. Hinkel, Jr., Metallurgist, Carpenter Steel Company

Mr. William McNeill, Electrochemist, Frankford Arsenal

Mr. Harry W. Antes, Metallurgist, Frankford Arsenal

Mr. Leonard Rubin, Research Assistant, Massachusetts Institute of Technology

Mr. Robert Harris, Metallurgist, Pitman-Dunn Laboratories

Mr. Ned Hehner, Metallurgist, National Lead Company

Dr. Geoffrey E. Brock, Metallurgist, International Business Machines Company

Mr. S. Peter Nowak, Metallurgist, General Electric Company.

TWO NEW WHALES

The Investment Casting Institute honored two men with its coveted "whale award" at its fifth annual meeting in Chicago.

Vincent S. Lazzara, president of Casting Engineers of Chicago, was awarded the whale for his "devotion to the Institute since its inception". Lazzara, who has served as treasurer, vice president and president of the group, also conceived the idea of the whale award several years ago.

Also honored was Dr. Richard A. Flinn of the University of Michigan for his liaison work between the Institute and the universities in the dissemination of educational information on the investment casting process.

The award symbolizes a "whale of a job" done by the recipients, and to date, nine men have been so honored.

DIE CASTERS . . . *Here's Added Savings!*

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IN 6 NEW STANDARD SIZES

Check these **NEW** *sizes..*

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$14^{7}/_{8}$" x $23^{3}/_{4}$"
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STANDARD PLATE THICKNESSES FROM $^{7}/_{8}$" to $5^{7}/_{8}$"

ALL PLATES GROUND FLAT and SQUARE
Ready for your die layout and cavity inserts

Precision Ground LEADER PINS and BUSHINGS
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PLAST-IRON POWDERS

ELECTROLYTIC AND
SPONGE IRON POWDERS

PREMIXED CU-NI-FE-POWDERS
+C+LUBRICANT

GROWTH CONTROLLED IRON POWDERS

HIGH DENSITY IRON POWDERS

10 STANDARD COMPACTING GRADES

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TO FIT YOUR NEEDS

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ELECTROLYTIC IRON CHIPS
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PM-54

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and Working Sample

PM
PLASTIC METALS

PLASTIC METALS
Division
National-U.S. Radiator Corporation

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JOHNSTOWN, PA.

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CARBORUNDUM CO. COMBINES THREE DEPARTMENTS

General Clinton F. Robinson, President of The Carborundum Company, announced that the Company's Stupakoff Division at Latrobe, Pa., Globar Div. at Niagara Falls, N. Y., and Refractories Division at Perth Amboy, N. J. will be integrated into one division, named the Refractories Division. All personnel, plants and activities, except the Stupalox sintered oxide cutting tool project formerly at the Stupakoff Division will be combined in the newly established Refractories Division.

Boyd M. Johnson, Vice President of the Company, was named General Manager of the New Division. Robert A. Barr was appointed Assistant General Manager in Charge of Sales and A. L. Leo-Wolf was made Assistant General Manager in Charge of Operations. Johnson, Barr and Leo-Wolf were formerly General Managers of the Refractories, Stupakoff and Globar Divisions respectively which are now merged into the new, more diversified Refractories Division.

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★ **CADMIUM**
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HIGHEST QUALITY
FUSIBLE & EUTECTIC
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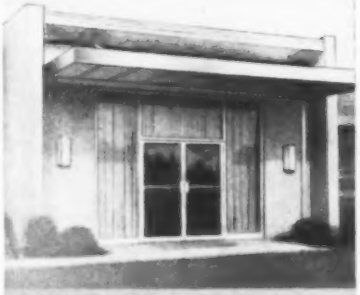

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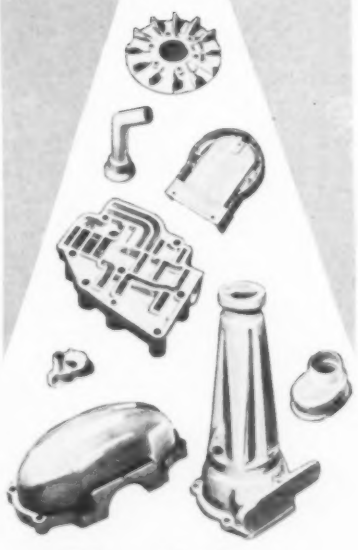

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Large castings, small castings, varied shapes and sizes . . . thin walls, combining strength and rigidity . . . close tolerances that eliminate machining — are every day routine at PARAMOUNT.

Our designers, sales engineers, plus modern tooling and production facilities are available for your complete die casting requirements.

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DESCRIPTIVE BROCHURE

ALUMINUM ZINC MAGNESIUM
Paramount
DIE CASTING COMPANY
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Circle No. 101 on the Reader Service Card

P.M.P.M.A. ON NATIONAL METALS COMMITTEES

Two executives from the industry that produces structural and bearing parts made of powder metals are now officially representing the technical committee of the Powder Metallurgy Parts Manufacturers Association on two other important groups.

To improve technical liaison for P.M.P.M.A., Harold F. Mitchel, chief engineer of U. S. Graphite Company, Saginaw, Mich., has been named to the powder metal products sub-committee of S.A.E.

Paul J. Failla, products manager for Johnson Bronze Company, New Castle, Pa., is the official representative of the P.M.P.-M.A. technical committee on the A.S.T.M. Committee B-9.

FORMATION OF GENERAL VACUUM CORPORATION

W. G. Overacker of Winchester, Massachusetts, announced today the formation of General Vacuum Corporation, of which he is President. The new company is located at 400 Border Street, East Boston, Massachusetts. The plant has 25,-000 square feet of manufacturing and office space.

Other officers of the new company are R. A. Knight, of Wenham, Treasurer, and D. J. Tobin, of Wellesley Hills, Vice President.

Mr. Overacker stated that the new company plans to concentrate its effort on engineering, development, testing and sales and that arrangements have been made for Artisan Metal Products, Inc., of Waltham, to fabricate equipment to General's design. The new company plans to concentrate initially on the intermediate sizes of special high vacuum equipment as well as developing an improved line of pilot-plant induction and arc melting vacuum furnaces. Mr. Overacker, formerly Sales Manager of NRC Equipment Corp., Newton, points out that the vacuum equipment market is growing beyond the scope of many of the research-oriented early pioneers in this field.

Mr. Tobin, who will head up the design and engineering group, pointed out that the unique framework of General Vacuum Corporation will bring to the industry equipment manufactured to accepted industrial standards. Mr. Tobin, formerly in charge of engineering at NRC, stated that the new company should be able to provide improved delivery schedules, lower costs, and more personal sales and technical services.

STOKES APPOINTS GOEHRING MANAGER OF MANUFACTURING

Walter W. Goehring

Walter W. Goehring has been appointed manager of the manufacturing department of F. J. Stokes Corporation according to an announcement by F. J. Stokes, Jr., vice president.

Mr. Goehring was formerly manager of manufacturing for the Can Division of Crown Cork & Seal Company, Inc., and before that was general factory manager of SKF Industries, Inc.

3 NEW PRESSES by JOHNSON ideally suited for DIE CAST TRIMMING

- ★ Extra Wide Beds
- ★ Extra Deep Throats
- ★ Extra Large Ram Faces
- ★ Extra Shut Heights
- ★ Extra Large Openings Through Backs
- ★ Pin Clutch or Air Clutch
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FOR DETAILED SPECIFICATIONS PHONE, WIRE OR WRITE FOR BULLETIN 1958

Presses of unmatched versatility for draw, punch, trim, cut and assembly operations. 23 Models — 16 to 150 ton cap. OBI Presses. Also Double Crank Gap and Straight Side Presses up to 250 ton cap. Horn Press — 60 Ton

Johnson MACHINE and PRESS CORP.

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COSTS GO DOWN!
Production goes UP!

with the Automatic
DORSEY PISTON AND
CYLINDER LUBRICATOR

for aluminum cold chamber die casting machines . . .

- EASY TO INSTALL
- REDUCE DOWN TIME
- INCREASE CYCLES PER HOUR
- REDUCE REJECTS
- SAVE LUBRICANT
- INCREASE PLUNGER AND CHAMBER LIFE

These are only a few of the savings you make when the Dorsey Automatic Piston and Cylinder Lubricator is installed on your aluminum cold chamber die casting machines.

PRECISE LUBE CONTROL

The Dorsey Automatic Lubricator permits precise control of the amount of lubricant used. The correct amount of lubricant being introduced at every cycle, eliminates the waste and mess of too much lubrication and prevents damage caused by too little lubrication.

NOTHING TO GET OUT OF ORDER

The design is efficient and extremely simple with nothing to get out of order and cause maintenance problems. Each stroke of the plunger activates the Dorsey Automatic Lubricator assuring full coverage of both the cold chamber and plunger.

ACTUAL TESTS PROVE EFFICIENCY AND SAVINGS

Leading die casting firms have proved in actual production use that the Dorsey Automatic Lubricator reduces overhead and improves production. You, too will find the savings in lubricant, rejects, servicing and replacement plus increased production will repay the cost of installation many times over.

● Write NOW for literature, full details and prices . . .

WESTBROOK MFG. CO.
P.O. Box 231 — St. Joseph 2, Mich.

For more information circle No. 127

NEW VICE PRESIDENT OF DU-WEL METAL PRODUCTS

L. E. Capek

Du-Wel Metal Products has elected L. E. Capek vice president and sales manager. Ted Bator, president, who previously acted as sales manager, will devote to administrative matters.

Mr. Capek has been associated with Du-Wel Metal Products since 1952 and has acted in the capacity of general superintendent along with some sales work on specific limited accounts. Prior to his association with Du-Wel, Mr. Capek was general manager of Security Lock Nut Corporation and before that was in charge of quality control at the Stewart Die Casting Division of Stewart-Warner.

CLEARING MACHINE CORP. APPOINTS VICE PRESIDENT

E. J. Baumrucker

Ervin J. Baumrucker has been appointed Vice-President in Charge of Domestic Press Sales for Clearing Machine Corporation, division of U. S. Industries, Inc.

Mr. Baumrucker joined Clearing Machine Corporation at the start of his business career 21 years ago. He has been with the company continuously, except during World War II when he served as a Lieutenant (Senior Grade) in the Navy.

He has worked in various departments of Clearing, including Accounting Cost Control, Sales Engineering, and Sales.

Zinc and Aluminum Die Castings combined furnish a useful kitchen meat grinder.

The zinc die casting supplies weight and can be finished to paint or chrome.

The aluminum die casting supplies the corrosive resistance with finish from dull to bright.

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2220 NO. ELSTON AVE. CHICAGO 14, ILL.
Phone ARmitage 6-4803

For more information circle No. 56 on the Reader Service Card

DATA IN ADS

continued from page 58

66. Zinc Die Casting—"Die Casting with Zinc Alloys", is the title of a technical guide for plant managers and die casting machine operators, available in quantities from Henning Bros. & Smith, Inc.

69. Heavy Duty—die casting machines. Information from Hydraulic Press Mfg. Co., describes automatic ladling design features on the company's line of heavy duty die casters.

76. Trim Presses—especially suitable for removing flash from die castings are described in Bulletin 1958 from Johnson Machine & Press Corp.

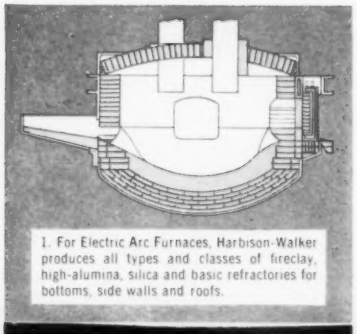
78. Die Casting Machines—Two new hydraulically operated die casting machines are described in a catalog. Kux Machine Co.

79. Die Casting—Information on the facilities and services of Latrobe Die-Casting Co., from initial design to completed casting, is available.

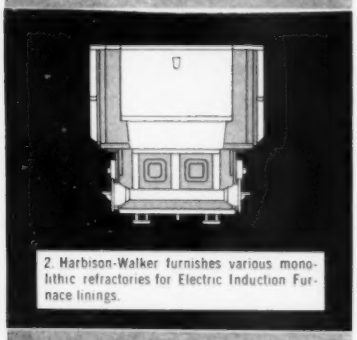
81. Die Casting Machines—Bulletin 101 from Lester-Phoenix, Inc., gives specifications and complete descriptions for the company's line of die casting machines.

HARBISON-WALKER

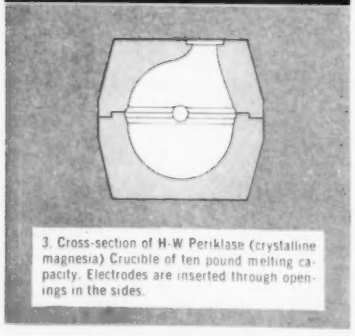
REFRACTORIES



1. For Electric Arc Furnaces, Harbison-Walker produces all types and classes of fireclay, high-alumina, silica and basic refractories for bottoms, side walls and roofs.



2. Harbison-Walker furnishes various monolithic refractories for Electric Induction Furnace linings.



3. Cross-section of H-W Periklase (crystalline magnesia) Crucible of ten pound melting capacity. Electrodes are inserted through openings in the sides.

meet every melting furnace requirement

AMONG the many kinds of refractories made by Harbison-Walker for all the different types of electric induction, arc and resistance furnaces and for the wide variety of metals, are some particularly adapted for highly specialized requirements.

H-W CORUNDUM is the 99+% Alumina preformed refractory used in linings of furnaces for melting pure aluminum, free from contaminants.

H-W PERIKLASE melting crucibles are the accepted standard for many precision metal molding operations.

We will be glad to provide complete data for these and other Harbison-Walker refractories, especially suited for melting furnaces.

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AND SUBSIDIARIES
World's Most Complete Refractories Service
GENERAL OFFICES PITTSBURGH 22, PENNSYLVANIA

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83. Die Casting—Informative literature is available on specialized designing for magnesium and aluminum die castings. Litemetal Dicast, Inc.

88. Aluminum—Permanent Mold Castings. "Manufacturing Achievements in Molten Aluminum" describes modern methods in mold designing, metallurgy and mass production operations. Monarch Aluminum Mfg. Co.

94. Plast-Iron Powders—Technical data on 10 standard compacting grades of iron powders is available from the Plastic Metals Div., National-U.S. Radiator Corp.

96. Zinc Die Castings—is the title of an informative folder from The New Jersey Zinc Co., describing the complex shapes that can be achieved by this process.

97. Brass Powder Parts—Detailed information on the design properties, production, and application of brass and other non-ferrous powder parts is available from The New Jersey Zinc Co. 20 case histories are included.

99. Plaster Mold Castings—made from brass, bronze, aluminum and beryllium copper are discussed in an illustrated brochure from Ohio Precision Castings, Inc.

101. Die Casting Facilities—A brochure, prepared by the Paramount Die Casting Co., describes the company's facilities for making specialized die castings.

109. Vacuum Feed—die casting machines. Full information on the advantages of the "Vacucast" process for zinc die castings is available from Reed-Prentice Corp.

110. Iron Powders—Booklet Adv-763, from Republic Steel Corp., contains information on test evaluations, chemical composition, and physical properties for their line of powders with the controlled dimensional factor process of manufacturing.

112. Cavity Blocks—Literature and prices are available on Master-Mold cavity blocks that cut die costs, reduce set up time, save storage space and make short runs profitable. Richards Tool & Mold Co.

115. Ladles & Skimmers—Complete data and prices can be obtained from Spincraft, Inc., on their stainless steel ladles and skimmers.

116. Powder Metal—presses featuring independent press adjustments and direct-reading calibrations are presented in data from F. J. Stokes.

Vacuum Equipment—Vacuum Metallizers that produce a

bright metallic finish at lower cost than electroplating; and vacuum furnaces that enable special alloying under vacuum as well as melting of metals susceptable to oxidation in normal atmospheres, are described in literature from F. J. Stokes Corp.

118. Melt Any Metal—A complete catalog is offered by the Stroman Furnace & Engineering Co., describing Stroman's line of furnaces for the melting of brass, bronze, aluminum, magnesium and grey iron.

120. Industrial Opportunities—Details are available from the Tennessee Industrial & Agricultural Development Commission on the state of Tennessee as being ideal for locating branch facilities.

127. Piston Lubricator—The Dorsey automatic piston and cylinder lubricator for aluminum cold chamber die casting machines is described in an illustrated folder from Westbrook Mfg. Co.

130. Barrel Finishing—A 52-page barrel finishing engineering handbook is available from Almco, Division of Queen Stove Works. Information is also available on the company's complete line of finishers.

133. Contact Wheel—A new sectional rubber contact wheel that shapes itself to the work piece is described in informative literature from the Chicago Rubber Co., Inc.

135. Finishing Equipment—New lower prices on tumble finishing equipment are given on price lists for 2 compartment machines in sizes 48", 36", 32" and 24". Grav-i-Flo Corp.

138. Trimming Presses—Bulletin 142 tells why users are getting more pieces trimmed per hour with Hannifin Corp., high-speed hydraulic trimming presses.

139. Coatings—Technical data sheets describe coatings for chemical polishing and deburring of zinc die cast parts. A clear or yellow golden chromate finish for aluminum is also described. Heatbath Corp.

142. Cleaning — and phosphating metal surfaces for painting with Phosteem and other metal conditioning, rust removing and phosphatizing products, for steel, aluminum, zinc cadium, etc., is described in Bulletin 55-137, Neilson Chemical Co.

143. Centrifugal Dryer—Illustrated 4-page folder describes the New Holland Machine Company's Kreider centrifugal dryer which air-dries as it spin-dries.

146. Precision Barrel Finishing—is the title of a new booklet issued by Oakite Products, Inc. It contains valuable information on cutting down, deburring, descaling and burnishing.

147. New Design—Bulletin 1403 from Pangborn Corp. describes design improvements on the company's "Hydro-Finish" equipment.

148. Barrel Finishing—and mechanical finishing processes are presented and illustrated in a new, technical data, folder from Roto-Finish, Inc.

149. Paint Adhesion Problems—An informative reference manual from Turco Products, Inc. tells the complete story of phosphating and includes a valuable "Phosphating Reference Chart" which gives the answer to any paint adhesion problem.

151. Ferrous, Non-Ferrous Investments—Information, specifications and prices are available from Centrifugal Casting Supply Co. on six "Whip-Mix" investments for ferrous and non-ferrous casting.

153. For Precision Painting—A 20-page book shows the different types of spray masks offered by Wm. M. Fiore, Inc. The book gives case-study illustrations of their use in decorating plastics, stampings and die castings.

The FEDERAL "55" gives you

OVERSIZE DIMENSIONS

Eliminates the need for larger and more costly equipment! Boosts production on big and bulky jobs!

Here's a press that will handle big, bulky jobs ordinarily requiring larger, more expensive equipment. Equipped with foolproof air clutch, its speed is increased many times, safely and with better control. Only the finest components are used in the "55". Workmanship, as in all Federal Presses, is unexcelled. Flywheel or geared types. Mechanical clutch standard. Call your dealer. Write for catalog.

Above
No. 55 Flywheel type—56-ton capacity
Also available
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No. 33—26-ton capacity

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FEDERAL Gear-back Toolmaker **PRESSES**
33 Years of Quality Construction

For more information circle No. 57 on the Reader Service Card

FERGUSON ELECTED DIRECTOR OF NATIONAL RESEARCH

Hugh S. Ferguson has been elected to the Board of Directors of National Research Corporation according to an announcement by Richard S. Morse, President.

Commenting on the new appointment Mr. Morse said, "We are pleased to welcome Mr. Ferguson to the National Research Board; his broad experience in the chemical industry will be particularly valuable in guiding National's future programs in the chemical and metallurgical fields.

MARTIN NAMED VICE PRESIDENT, SAMUEL GREENFIELD CO.

The appointment of Arnold J. Martin as Vice President of the Samuel Greenfield Co., Inc., smelters and refiners, was announced yesterday by Mr. Samuel Greenfield, president. Mr. Martin has been associated with the Greenfield Company since 1946 and has been manager of sales and advertising for the past three years. Prior to 1946, he was associated with the Linde Company, serving with them on the Manhattan Project of the A.E.C.

KOLCAST INSTALLING VACUUM MELTING FURNACE

The world's largest induction vacuum melting furnace is in the final stages of installation at the Minerva, Ohio works of Kolcast Industries, Inc., affiliate of Thompson Products, Inc.

Reason for construction of the new furnace is to provide large vacuum melted investment castings by the unique Kolcast molding process for the jet engine, electronic, guided missile, atomic energy and precision parts industries. Capacity of the new furnace will be 350 lbs. It will be used to manufacture an unlimited variety of castings in sizes up to 45 inches.

The present Kolcast furnace, believed to be the largest induction vacuum melting furnace currently in operation, is capable of producing 200,000 lbs. per month. Kolcast is now pouring 2400 lb. ingots of such vacuum-melted super alloys as Waspalloy, M-308, Rene 41, MT-252 and GMR-235. A third furnace is planned for installation early in 1958. Current applications for vacuum-melted stock, plus new applications that are being uncovered daily, will keep the Kolcast furnaces running at capacity throughout next year.

Conversion of Kolcast ingots to billet, bar, slab and other mill products is being handled by Firth Sterling, Inc. Firth Sterling's conversion capacity will be kept adequate to process all of Kolcast's production in addition to its regular high temperature alloy and tool steel products.

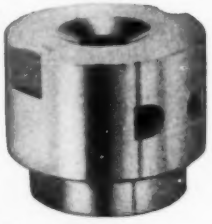
HOLLAND NEW MANAGER OF NATIONAL PRECISION CASTING

Paul C. Holland has been appointed general manager of National Precision Casting Corporation, a subsidiary of The Beryllium Corporation. Mr. Holland previously held the position of product manager with The Beryllium Corporation.

National Precision Casting Corporation, producers of both ferrous and non-ferrous precision castings, recently moved into a new 27,000 square feet plant located near Paoli, Pa. The move was part of a half million dollar modernization program to make National Precision one of the largest integrated precision casting firms under one roof in the United States.

NOW ESPECIALLY DESIGNED FOR ADDED SAVINGS TO DIE CASTERS!

D-M-E STANDARD Water-Cooled SPRUE BUSHING



- *Nitrided for Longer Wear*
- *Large Capacity Cooling Jacket*
- *Ground, Nitrided and Polished Seat*
- *Available From Stock*
- *Priced at $25.00 Each*

D-M-E STANDARD Water-Cooled SPRUE SPREADERS

- *Nitrided for Longer Wear*
- *Straight or Tapered Body*
- *Uniform Center Cooling for Fast Cycles*
- *High Quality Air-Hardening Steel*
- *Available From Stock*
- *Priced at $16.00 Each*

D-M-E STANDARD TAPERED CUTTER for Sprue Spreaders

- *Solid Carbide Cutting Edges — Rigid One-Piece Design*
- *Specially Designed for Standard Sprue Spreaders*
- *Available From Stock*

- *Priced at $28.00 Each*

Call or write TODAY . . . For Complete Specification Sheet!

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NOW! A Revolutionary Fast Hydraulic TRIMPRESS to Exactly Fit Your Needs!

76 CAVITY OPENINGS

28 PLATEN SIZES

15, 20 and 30 TON Models

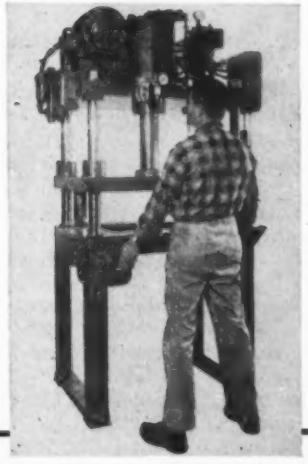
12" STROKE

"Shutheights" 0", 5" and 10"

with only 3 to 5 HP MOTORS

Uses A Minimum of Floor Space!

2 and 4 Post Models!



Typical operations include: Staking, Swaging, Stamping, Shearing, Blanking, Trimming, Forming and Drawing!

Write, Wire, Phone for Details!

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Circle No. 30 on the Reader Service Card

NEW IRON POWDER PLANT

Construction of a new plant for the production of iron powder will be undertaken shortly by the Alan Wood Steel Company.

Harleston R. Wood, President, stated that the new plant will have a considerably larger capacity than the plant authorized originally by the Company's Board of Directors. The new plant will cost approximately $3,600,000 compared with $2,235,000 in the original appropriation and will have a capacity of 50 tons per day of iron powder.

The enlarged plant will be located at Ivy Rock, Pa., adjacent to Alan Wood's open hearth department where the Company can supply the new plant's hydrogen requirements from its own coke oven gas. National Cylinder Gas Company has agreed to construct a new oxygen producing plant in the vicinity which will supply the oxygen required in the manufacture of iron powder.

Mr. Wood stated that the raw material to be used for the production of iron powder will be ore from the Company's Scrub Oak Mine at Dover, New Jersey.

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Introducing

TITANIUM POWDER 99+%

- *All mesh sizes.*
- STABLE IN AIR.
- *Compacts easily.*

Catalytically active (large surface area/unit weight)

We will be glad to send you a reprint of the article "Introducing Commercial Titanium Powder" as it appeared in the December issue of this publication.

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DIE CASTINGS by MILWAUKEE

Yes, the folks at Milwaukee have learned a lot in these many years of continuous service to industry in the design and production of die cast components for all kinds of products. When you come to Milwaukee for your die castings, their experience is yours at no extra cost. Backed by the facilities of its modern plant, Milwaukee offers you Complete Die Casting Service to help you realize more fully than ever, *all* of the benefits of the die casting process.

Milwaukee operates under the Certified Zinc Plan of the American Die Casting Institute.

MILWAUKEE DIE CASTING COMPANY
4146 N. HOLTON STREET • MILWAUKEE 12, WISCONSIN
Established 1909

For more information circle No. 87 on the Reader Service Card

POWDER METALLURGY CLINIC AT PRESMET

Marketing a new precedent in the powder metallurgy industry, Worcester's Presmet Corp. held "open house" to the nation's powder metallurgists today. Some 50 metallurgists toured Presmet's powder metallurgy processing facilities as well as those of Massachusetts Steel Treating Co. where many of Presmet's metal powder parts are being heat treated.

George Roberts, vice president of Vanadium-Alloys Steel Co. and president of MPA and Kempton H. Roll, executive secretary of MPA, both present to open the conference, heralded this event as the beginning of a new era of technical exchange in what had heretofore been an industry noted for its trade secrecy.

Among those making the plant tour and participating in a special technical conference which took place later were representatives from International Business Machines Corp., Ford Motor Co., Amplex Div. of Chrysler Corp., Yale & Towne Mfg. Co., Lionel Corp., A. C. Gilbert Co., Pitney-Bowes, Inc., National Cash Register Co., Underwood Co., Remington Arms, Mueller Brass Co., and others totaling 27 different companies all making metal parts by the comparatively new powder metallurgy process making solid metal items by pressing and sintering metal powders.

western New York's most modern completely equipped die casting plant

Product design, engineering, die building functioning as a team under one roof to serve varied industries such as . . .

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- √ TELEVISION
- √ ELECTRICAL APPLIANCES
- √ AUTOMOTIVE
- √ OFFICE EQUIPMENT
- √ BUILDERS HARDWARE
- √ FURNITURE
- √ TELEPHONE

Falconer Metal Specialties, in its modern spacious plant, offers the highest quality products to users of die castings. Its facilities include: high pressure machinery for zinc and aluminum, automation for high speed production runs, and specially built finishing and plating equipment.

RESEARCH PARTICIPANT

FMSCo FALCONER METAL SPECIALTIES CO.
WINCHESTER RD., LAKEWOOD, N. Y.

For more information circle No. 1 on the Reader Service Card

MILLER JOINS NATIONAL PRECISION CASTING CORP.

W. C. Miller

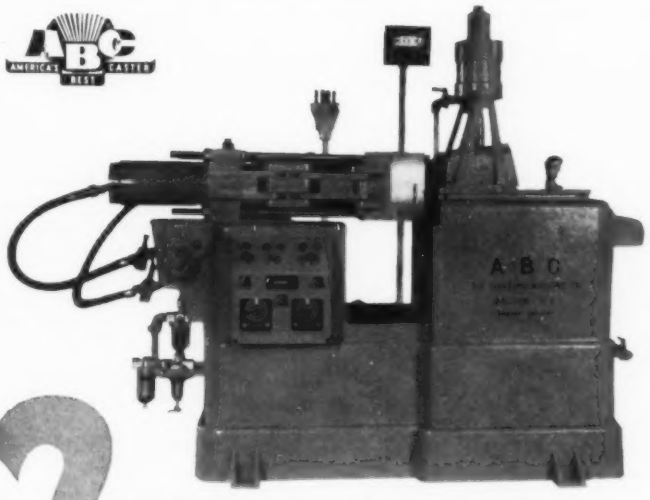
William C. Miller formerly of Dayton, Ohio has been appointed sales manager of National Precision Casting Corporation, company officials announced today. A producer of both ferrous and non ferrous precision castings, the firm recently moved into a new 27,000 sq. ft. plant located near Paoli, Pa.

CONFORMING MATRIX TECHNICAL CLINICS

A series of technical clinics emphasizing spray decorating techniques and new developments in automatic spray painting machines will be held in five key cities during January, February and March. The clinics will be sponsored by Conforming Matrix Corp. The schedule is:

January 9	Hotel Hollenden, Cleveland
January 23	Hotel Van Cleve, Dayton
February 6	Hotel Claypool, Indianapolis
February 27	Hotel Biltmore, New York
March 7	Hotel Statler, Hartford, Conn.

The clinics will include industrial films which show the proper use of spray guns, the care and maintenance of spray equipment, advantages of masking techniques and types of spray painting machines.



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Thousands of extra pours per ladle, with less effort for operator . . .

the Spincraft STAINLESS STEEL ladle for non-ferrous metal pouring

LIGHT • TOUGH • LONGER-LASTING!

If you pour non-ferrous alloys, Spincraft ladles will save you replacement costs and make the job much easier. Designed to reduce operator fatigue by their lightness, balance, and non-spill shape, they resist burning-through as only stainless steel with its high critical melting point can do. Spincraft ladles come in 23 sizes, from ¼ lb. to 30 lb. molten metal capacity.

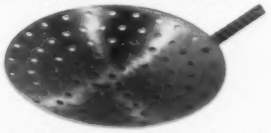
- 75% lighter than cast iron ladles
- Amazingly long life
- Shot-blasted for coating adhesion
- Deep conical form makes pouring easier, minimizes spillage
- Can be used for zinc and other metals without coating
- "Whack proof" handle arc-welded to reinforced cup edge
- Built to last longer, work lighter. Let your operator use one, then try to take it away from him!

Complete handle on ¼ lb. through 9 lb. size. 10 through 30 lb. size has handle bracket stub to which proper length handle can be attached.

Spincraft ladles are also available in low-cost mild steel.

Also . . . Spincraft STAINLESS STEEL Skimmer

A skimmer that really skims! Shallow radius skims surface impurities instead of ladling as deeper-cupped skimmers do. Correct size holes prevent clogging. Short handle stubs fit common pipe and permit attachment of length and type handle you want.



IN FOUR DIAMETERS: 6 inch, 8 inch, 10 inch, 12 inch. Also available in mild steel.

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HEAT CONTROL

continued from page 47

to the die surface, and the speed of production will suffer.

The temperature of the die is controlled mainly by using internal water cooling in the sections where heat is concentrated. Around the gate areas of the die much water cooling is required.

In some large dies which run slowly, or in complex dies which have a long casting cycle, it may be necessary to heat some sections of the die to keep them at working temperature.

The actual control of the die temperature in practice is left to the casting machine operator. It is a balance between the heat input, as determined by the rate of production and the size of the casting, and the ability of the cooling system of the die to remove heat.

With fast running dies and heavy castings the pressure is on the cooling system to keep the die cool. With slow running and difficult dies the pressure is on the operator to speed up the casting rate and keep the die hot.

For measuring the die surface temperature a highly specialized group of transducers and instruments have been developed. All work on the radiant heat principle to read the average temperature of an area of the die surface.

These depend upon the distance of the pickup from the surface and the included angle of focus of the transducer. The best of these instruments, a Radiation Bolometer Recorder, will focus on a spot two inches in diameter from a three foot distance to give a visual record of the temperature in less than one second.

This bolometer is portable and can be moved to any die casting machine to record the surface temperature of the die during operation. It is used in the tryout of dies to establish the ideal heat balance conditions.

This instrument is an aid to detecting overheated areas in the die and to improve the water cooling system. The bolometer chart in figure 4, shows the actual temperature recording of a die.

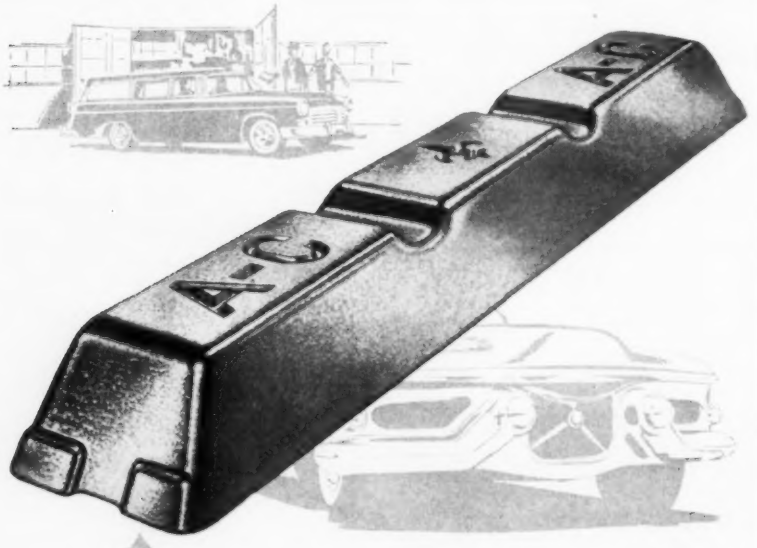
During production, the temperature conditions in the dies are checked frequently by the use of contact pyrometers. Tempilstiks, or pocket radiation pyrometers. A pocket radiation pyrometer looks like a light meter. It works quite well and gives a fast, reliable reading.

These instruments were developed for this work because of the difficulty of measuring die temperatures with built-in thermocouples. The low thermal conductivity of die steel coupled with the thermal shock of injection causes big temperature variations through the die and casting cycle.

Thermocouples located in strategic places of the die, as shown in figure 2, indicate only a relative temperature of a certain area of the die. Since each movable part of a die would have to have its own built-in thermocouple to insure proper recording, this is usually too expensive.

Only on unusually large dies where temperature differences have a more serious affect on quality and casting dimensions, are built-in thermocouples used. Figure 3 shows the relatively expensive temperature control and recording instrumentation for our largest die casting machine when producing engine blocks.

Even in these dies with built-in thermocouples the actual control



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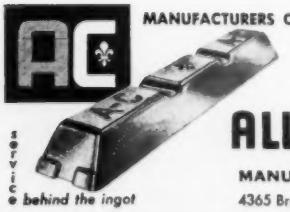

service behind the ingot

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HEAT CONTROL

continued from page 130

of the recorded temperature of the die segments is established by manual adjustment of the cooling water flow.

The manual adjustment works fairly well when the die is in uniform operating conditions. It is not satisfactory during the starting time and during interruptions. When the heat input of the molten metal is suddenly stopped the die cools off fast, even if the cooling water is turned off by the operator of the machine.

This heat loss during non-operating periods is partly compensated by heating the die halves externally with soft flame torches, not a dependable method.

Many attempts have been made in the past to develop a completely automatic temperature control system. By regulating the flow of cooling water with the aid of a thermostat, or by providing a heat exchanger.

A heat exchanger heats the die during interruptions and cools it in production, the temperature may be automatically controlled at the optimum level and such provisions have been made on a few test dies.

For large dies and intricate impression blocks with their many water passages this automatic temperature control would be extremely complicated and has not yet been used in production dies.

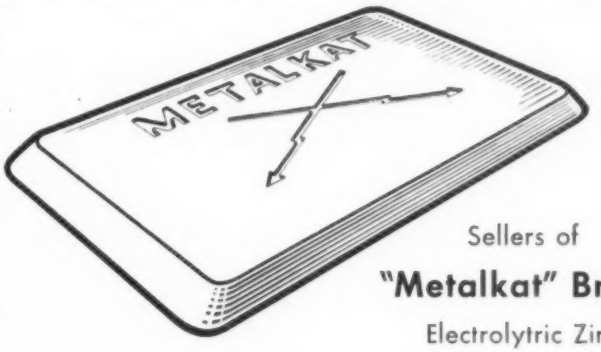
CONCLUSION

Temperature control is absolutely necessary in every phase of the die casting cycle. The development of accurate temperature control instruments has contributed to the improvements in die castings. More uniform quality and production have been achieved by closely controlling the heat exchange and heat balance in the die casting die.

More progress towards better die castings and more economical operations can be accomplished if inexpensive automatic temperature control systems can be developed to replace the inaccurate manual adjustment.

The die casting process is a very sensitive and complex heat balance. Further improvements of the die casting quality and a total automation of the die casting process will depend largely on the development of better and less expensive automatic temperature control methods for the die casting cycle.

For more information circle No. 70 on the Reader Service Card



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SINTERINGS

Fiber Metallurgy — A New Process

THERE is a new technology using metal fibers rather than powders, and recent developments indicate the process may be the answer to a pressing need for complex porous shapes which maintain their strength, ductility and porosity.

Raw material for fiber metallurgy parts is wire in fiber or filament form, produced by a wire cutting or shaving process which yields fairly continuous strands of metal.

In the operation, a suspension or slurry of the metal fiber is in contact with a porous mold or die, subjected to vacuum. The liquid is drawn away from the mold, leaving the mat of fiber on the surface. This surface can be quite complex and intricate.

Physical property variations are obtained by controlling fiber length, diameter, kinking, surface roughness and porosity. Greater strength in a predetermined direction can be achieved by preferred orientation of the fibers.

For high density parts, the felted material can be processed through rolls or dies in either single or multiple steps. As sheet, it can be processed continuously.

Metallurgists sought to develop processing procedures aimed at making cylindrical and convoluted filter elements from metal fibers and metal fiber-metal powder combinations.

Fiber-resin mixtures suitable to several potential fabrication methods were used, rather than felting methods, since they have more flexibility of shape. Processes already worked out for metal powder-resin mixes were a logical starting point.

Among the several methods of fabrication investigated were: compression or injection molding, extrusion of fibers, extrusion of fibers and powders, vibration of fibers into a mold followed by vacuum injection of resins, and vibration of fibers and powders into a mold by vacuum injection of resins to obtain the shapes.

In the processing tests, commercially available fiber wools of bronze, iron, SAE430 stainless and aluminum were used.

A process involving vibration of fibers and vacuum filling of resin was found to be best.

The basic idea of this process is to fill a tubular die with fibers, then vibrate, add a thermoplastic resin and heat. The resin-fiber mixture is pulled through the die by vacuum. The mixture is then cooled, the die opened and the part removed.

Sintering of the mixture is done in a hydrogen atmosphere furnace. The resin is volatilized and driven off below the sintering temperature of the metal fibers; the fibers are then sintered at a prescribed temperature and time, yielding a porous filter.

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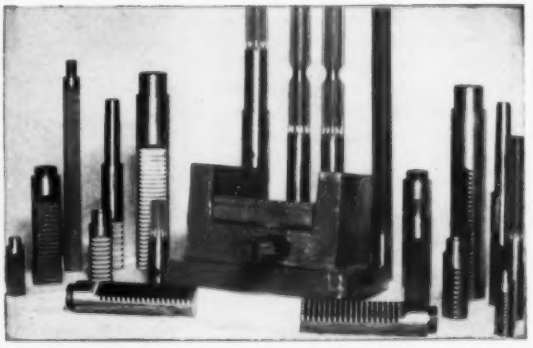

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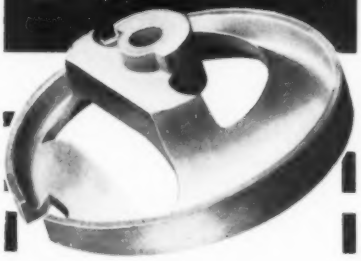
Cam Milling and Contour Machining *Eliminated!*



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INVESTMENT CASTING
Proves the Point

PART: Cam for Aircraft Instrument

MATERIAL: Stainless Steel, 440

PROBLEM: To reduce time and cost involved in setting up and performing 8 different types of machining operations.

SOLUTION: An EPCO Investment Casting Completely dispensed with

1. Cut-off
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5. Form Milling
6. Contour Milling
7. Slot Milling
8. Cam Milling

Leaving only cam polishing, bottom grinding and hole reaming.

CONCLUSION: Intricate Machine Parts by redesigning to EPCO Investment Casting tolerances can be made to give *better* performance at far less cost.

Send us drawings, samples and specification of parts for detailed process analysis and cost quotation without cost or obligation.

ENGINEERED PRECISION CASTING CO.

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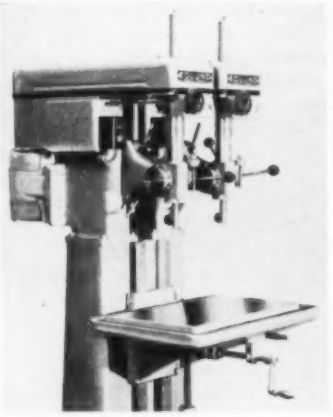
MEMBER INVESTMENT CASTING INSTITUTE

Circle No. 53 on the Reader Service Card

NEW PRODUCTS—

continued from page 112

DRILLING MACHINE . . . has 10" overhang



Model 1F High Speed Sensitive Drilling Machine combines a large 10" overhang with the same features of smaller overhang machines. This provides greater adaptability and makes bigger job application possible. Machines of from one to six spindles, with speed ranges from 625 to 10,000 RPM make it particularly adaptable in the high speed sensitive drilling of parts and assemblies.

Manufactured by Edlund Machinery Co., the machine is available in pedestal or bench models and in various combinations of from one to six spindles.

Circle No. 225 on Reader Service Card

VISUAL AID . . . has modern design

Telesight is the name of an optically correct visual aid for eyestrain protection. Distributed by William Dixon, Inc., the aid is available in hook-on style for regular eyeglasses, full frame for insertion of prescription lenses and half frame for persons who do not use eyeglasses.

All styles furnished in 14", 11", 9" and 7" focal range have a dual hinge movement which permits flipping up for normal vision and flipping down for magnified.

Circle No. 223 on Reader Service Card

THESE TWO NEW MACHINE VISES . . . incorporate two speeds

Two precision machine vises incorporating two-speed closing and gripping traverse with open-jaw

Continued on next page

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FOR ALL METAL MELTING INDUSTRIES

CUSTOM-TAILORED FOR EVERY ALLOY!

Packaged for your convenience 5 & 10 pounds, upon request.

ALUCO FLUXES.
Specially designed for casting aluminum alloys. Reduces oxidation, gives sound castings, removes nonmetallic inclusions.

IMMUNITAS FLUXES.
Exothermic aluminum flux. Successfully reduces dross from aluminum sweating.

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Zinc fluxes. Practically smokeless. Separates metal from dross. Leaves no metallic inclusions in dross.

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For more information circle No. 117

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have combined the experience of the *past* with the vision of the *future.* We are one of the oldest die casting companies in the Mid-West.

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STROH DIE CASTING Co. INC.
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NEW PRODUCTS—cont.

capacities up to 12″ x 12½″ have been announced. The units are available in five sizes with open-jaw capacities ranging from 2″ to 12¼″. All Hylo models feature a compact differential feed mechanism that permits a tremendous increase in gripping torque without sacrificing speed of traverse.

An unusual feature of the 6″, 8″ and 12″ models, announced by Redbow Precision Tool Co., is the open-jaw capacity equal to the width of the jaws.

Circle No. 239 on Reader Service Card

DIAMOND WHEEL DRESSING
. . . time cut by new method

Rubberized abrasive blocks will do a quicker and more thorough job of removing smear metal and clogging in diamond wheels than previous methods. This discovery was made by the Cratex Mfg. Co.

Rubberized abrasives do not knock the diamond particles loose from their metal bond as dressing blocks and other wheel dressers do. With the new method, the diamond wheel is restored to its free cutting action quickly and easily, and the life of this expensive item is lengthened.

Circle No. 240 on Reader Service Card

PNEUMATIC GRINDER
. . . features power, lightweight construction

The 1500 Series grinders have been announced by Cleco Air Tool Div., Reed Roller Bit Co. These pneumatic hand tools are designed for use in a variety of metal grinding, sanding and wire-brushing operations. Low maintenance, long life, simplicity of overhaul and lightweight construction are featured.

A lever-type thumb-tip throttle provides effortless control of the tool without changing grip, and a special muffler handle serves as an air exhaust.

Circle No. 241 on Reader Service Card

STEEL STORAGE BIN
. . . for die castings

This all-steel storage bin, stacking type, has a four-way entrance, and is designed for use with hand or power lift or fork truck. The unit can be tiered with a portable elevator, high lift or fork truck.

Manufactured by the Palmer-Shile Co., the unit has inside dimensions of: length 36″, width 36″, and depth 24″.

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For more information circle No. 8 on the Reader Service Card

TUMBLING BARRELS

. . . have new "no-seam" vinyl plastic lining

Visibility, ease of cleaning and long wearing qualities are improved with new orange-colored vinyl plastic lined tumbling barrels. Made by the Rampe Mfg. Co., the resilient linings feature a special "no-seam" application and provide a smooth, light-reflecting surface for cleaning and inspection. These new linings are highly resistant to wear and abrasion, oils and most chemicals.

Circle No. 243 on Reader Service Card

MECHANICALLY AGITATED CLEANING MACHINES

. . . for batch cleaning

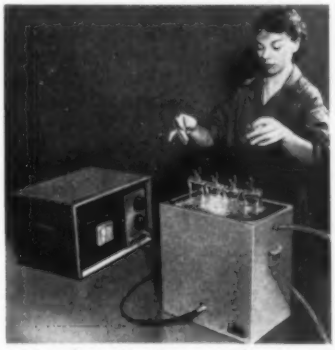
A new line of mechanically agitated cleaning machines has been announced by the Magnus Chemical Co., Inc. The "Magnus Miji-Lif" has been designed for batch cleaning of all types of metal, glass and plastic parts in solvents, mild acids, and alkalis. Up to 75 pounds of work can be cleaned at a time. The unit is operated by compressed air. The machine can also be used to apply coatings to metal parts.

Circle No. 244 on Reader Service Card

PROCESSING TANKS

. . . designed for economy

New 5-gallon and 8-gallon Sonitanks have been introduced for economical ultrasonic processing. The tanks feature extremely high ultrasonic efficiency operating at a resonant frequency of 20 KCS/sec. A new method of attaching the reinforced transducer elements by riveting, results in extreme ruggedness and greatly increased efficiency in the conversion of ultrasonic energy.



The tanks, manufactured by General Ultrasonics Co., fill a need for low cost, high intensity ultrasonic applications in cleaning, degreasing, pickling and electroplating of metals.

Circle No. 245 on Reader Service Card

NEW SLURIATOR KIT

. . . prevents solid packing of abrasive

The new Sluriator solves the problem of keeping fine abrasives thoroughly slurried in water for die and mold cleaning, deburring, maintenance cleaning, etc.

Developed by Pangborn Corporation, the new unit eliminates the need for a mechanical pump and auxiliary equipment and can be adapted to conical-bottom tanks by means of a conversion kit. The unit consists of a 4" diameter compressed air distributor set between two heavy gage wear-resistant alloy circular plates. These fittings are installed at the base of the sloping side walls so that the agitating air strongly sweeps the tank bottom as well as spirals through the body of the liquid to provide rapid and thorough agitation of the slurry.

The only equipment required to supply the new unit is a take-off from the regular 80 to 90-lb. compressed air line necessary to operate the nozzle, and a needle valve to regulate the air flow.

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Wherever threaded connections and screwed fittings are subject to prolonged exposure to extreme temperatures—up to 1200°F.—a little Thred-Gard saves a lot on maintenance costs: time, labor, thread stripping and replacement of fittings.

Thred-Gard eliminates seizing and galling, protects threaded surfaces, reduces wrench torque and allows plugs and bolts to be re-used many times over. It permits fittings to be drawn to a greater degree of tightness, yet provides a permanent lubricant that assists dis-assembly.

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FOR CLEANER ZINC AND ALUMINUM CASTINGS

Does not fume, flash nor give off offensive odors. Reduces soldering to a minimum. Produces clean, smooth pieces free from surface imperfections and discolorations. Makes stronger castings and increases die life.

Bulletins describing Fiske's 231 Die Casting Compound and other specialty lubricants and coolants sent on request.

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Plants: Newark 5, N. J. and Toledo 5, Ohio

For more information circle No. 58 on the Reader Service Card

CAST-MASTER EXPANDS

Cast-Master, Inc., has broken ground to add 30,000 square feet of manufacturing space to its plant. This addition follows a similar plant expansion program of 36,000 square feet completed last year. The current expansion permits Cast-Master's entry into the injection molding field and broadened service to its customers in the die casting industry.

Expansion plans call for the installation of additional new machine tools, including Model BL Keller and an 8′ x 12′ boring mill with duplicating attachments to make available outstanding facilities for accurate production of the largest machine parts and die casting molds.

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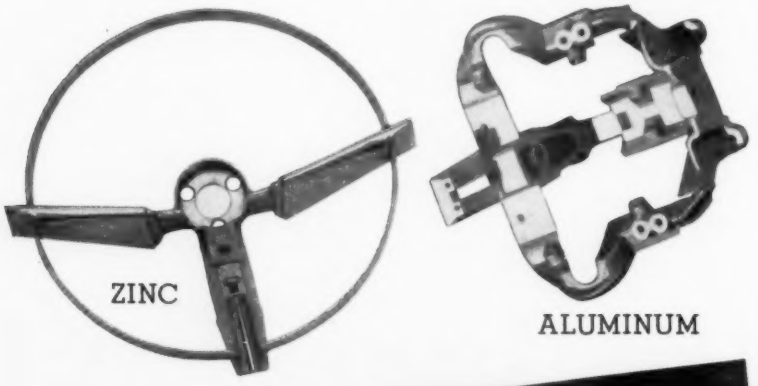

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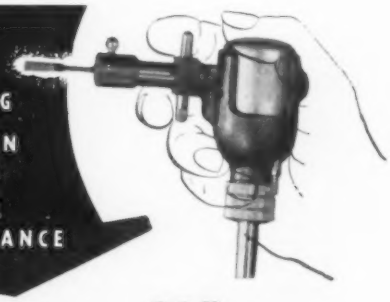

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